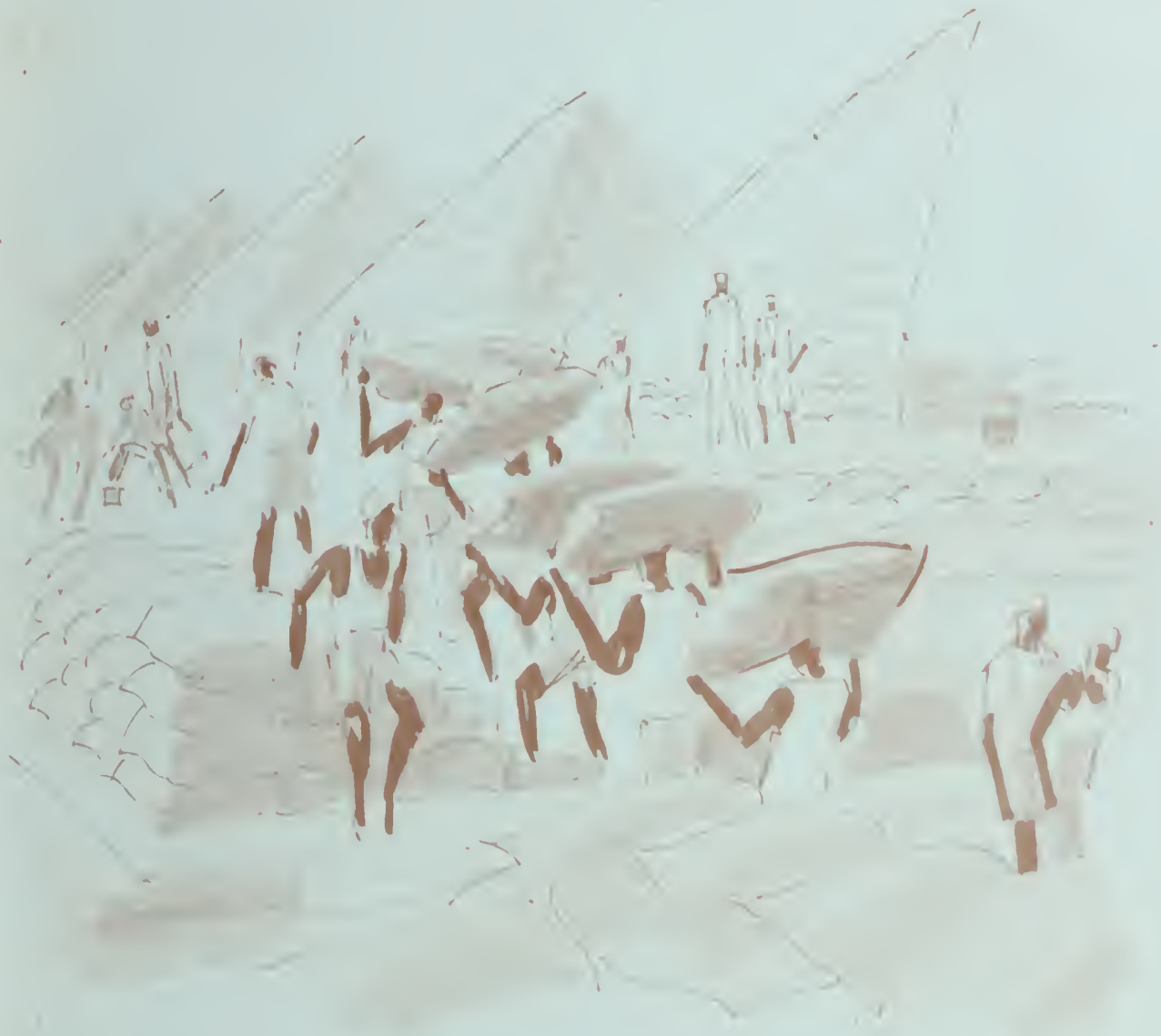


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THE AGRICULTURAL ECONOMY OF **NIGERIA**



ABSTRACT

Nigeria, the most populous country in Africa, has an economy based on production of raw materials, chiefly agricultural commodities and petroleum. Important agricultural exports include cocoa, peanuts, palm kernels, rubber, cotton, and hides and skins. Production of large quantities of yams, cassava, cocoyams, sorghum, millet, plantains and bananas, corn, edible cowpeas, palm oil, kolanuts, and other crop and livestock products enable the country to be largely self-sufficient for food. Major food imports include wheat, milk and cream, and sugar. Agricultural imports from the United States include wheat and flour, dried milk and cream, cereal preparations, and tobacco.

Key Words: Nigeria, agricultural production, agricultural trade, cocoa, peanuts, oil palm produce, rubber, cotton, livestock.

Note: Unless otherwise specified, measures of weight are expressed as metric tons of 2,204.63 pounds each. ₦, the Nigerian pound, equals U.S. \$2.80.

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SUMMARY

In 1969, agricultural exports from Nigeria totaled \$426 million, accounting for 48 percent of all exports of \$895 million. Major farm exports were cocoa beans and products, valued at \$171 million; peanuts and products, worth \$145 million; oil palm produce, \$43 million; and rubber, \$26 million. Agriculture's share in total exports has decreased from that in earlier years because of the rapid rise of petroleum. This resource has recently become the most important nonagricultural export; in 1969, value reached \$381 million. By early 1971, 1.5 million barrels a day were being produced. Development of petroleum has been one of Nigeria's most significant economic achievements in recent years; the country is now among the world's top 10 producers.

The former mother country, the United Kingdom, continues to be Nigeria's major trading partner, taking 27 percent of exports and supplying 35 percent of imports in 1969. The United States was Nigeria's sixth best customer for farm products in that year. In return, the United States supplied 37 percent of all Nigerian farm imports, including 99 percent of the country's wheat needs.

Chief food imports are sugar, wheat, fish, milk, and cream. Of these, the need for sugar can most probably be met by local production, which reached 43,000 tons in 1970. The Government is also encouraging wheat production though the climate is not well suited for this crop. In 1970/71, estimated yields were 5,800 tons from 8,000 acres.

Nigeria is the world's largest producer of palm oil and kernels, African yams, cowpeas, and kolanuts, and the world's largest exporter of peanuts. Gross national product was \$4.83 billion in 1969. Yams are the major domestic food; grain sorghum the biggest grain crop, followed by millet and corn. Plantains are the most important fruit grown. Other crops, produced chiefly for domestic consumption, include cassava, cocoyams, bananas, edible cowpeas, and rice. Livestock raised include cattle, sheep, goats, poultry (the most numerous),

and a small number of hogs. The Nigerian diet consists mainly of starchy root crops and is deficient in proteins. Daily per capita food consumption was 2,450 calories in 1959-61.

Much of agriculture is subsistence farming. Farm commodities are usually produced on small, individual farms without work animals or tractors. Farmers generally grow crops or livestock but not both. The economy is based on production of raw materials. However, Nigeria has diversified resources and farmers are able to produce crops actively demanded on the world market. For certain crops--mainly peanuts, cocoa, palm kernels, palm oil, cotton lint, cottonseed, and soybeans--marketing boards buy on a monopoly basis at a price fixed ahead of the marketing season. The goal is to reduce price inequalities within the country and to protect producers from fluctuating world prices. The marketing boards also provide revenue for the Government. They do not handle crops consumed domestically.

The country's overall economic outlook is good though problems remain. Some progress has been made in mechanizing the big peanut, cotton, and grain sorghum crops now grown largely by hand. New, better seed varieties are being selected, bred, and distributed, but not on a wide enough scale. Among economic problems are lack of people with managerial and technical skills, great distances and inadequate transportation, not enough electricity, and high cost of land clearing.

The blueprint until 1974 for economic development is a new, 4-year National Development Plan which predicts annual growth rate at about 7 percent, with petroleum and manufacturing as the fastest growing sectors. Economists at the University of Edinburgh also predict rapid growth for the Nigerian economy. Cocoa production should increase slowly. The value of peanut and peanut oil exports will rise. Wheat imports will grow because production will not meet the increased demand. Similarly tobacco and sugar imports will continue, though production of both crops will rise.

THE AGRICULTURAL ECONOMY OF NIGERIA

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LAND CHARACTERISTICS AND USES

The Federal Republic of Nigeria, popularly called Nigeria, has a total area of 356,669 square miles. The nation is half again as large as the Iberian Peninsula of Europe (Spain and Portugal). (See map in center of publication.) In outline, Nigeria is remarkably similar to Iberia, and the capital, Lagos, has the same relative location in Nigeria as the Portuguese town of Lagos in the Iberian Peninsula.

The area figure includes the former British Northern Cameroons, now an integral part of Nigeria. It does not include the former British Southern Cameroons, whose residents voted in February 1961 to join French Cameroun; the two parts form the present Federal Republic of Cameroon.

Easternmost of the countries making up West Africa, Nigeria lies north of the Equator, from about 4° to 14° north latitude. About 24 percent of the total area is agricultural land. Utilization of the land varies widely and is chiefly determined by the amount of rainfall.

Nigeria's southern coast faces the Gulf of Guinea (Atlantic Ocean). Part of the coast, especially along the many mouths of the Niger River, affords some of the world's wildest, most primitive scenery. The coastal climate is rather hot and humid with more rainfall than elsewhere in Nigeria (fig. 1). The natural vegetation is rain forest. Tropical tree crops are grown--chiefly cocoa, oil palms, rubber, and kola-nuts. Yams and cassava are popular food crops.

North of the coast, the elevation rises to about 2,000 feet, rainfall becomes lighter and seasonal, and the natural forest

thins out to savanna (grassland with scattered trees and shrubs). There are some oil palms but these grow only along the courses of the streams. Known as the middle belt, this area furnishes food to other areas, both north and south.

Farther north, the country has a long dry season, with high temperatures. Though the land would seem unfavorable to agriculture, it is here that Nigeria's huge peanut crop is grown, as well as its important cotton crop. Here, too, graze most of Nigeria's cattle. Sorghum and millet are the chief food crops.

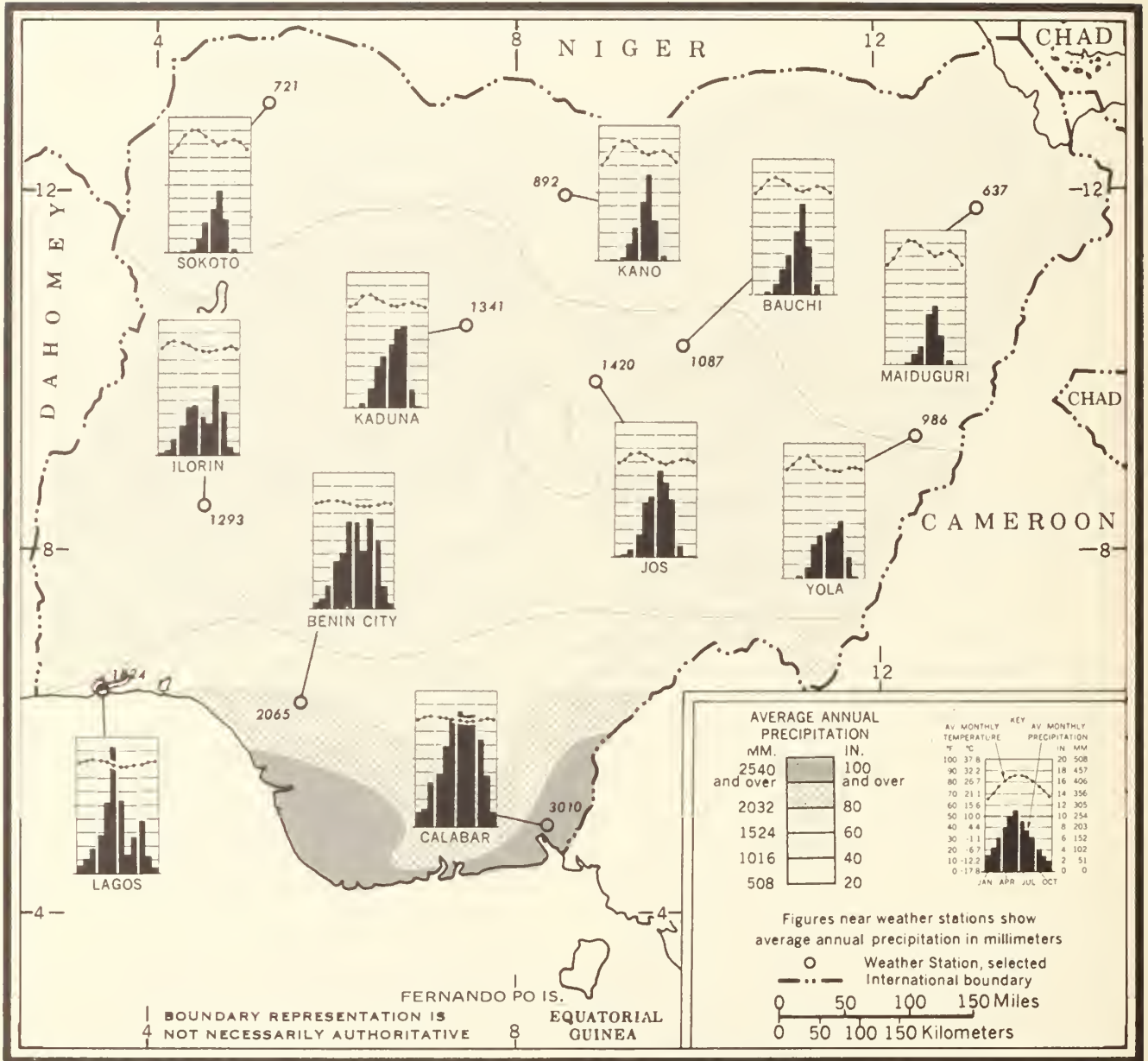
ECONOMIC INFRASTRUCTURE AFFECTING AGRICULTURE

Roads

In 1968, Nigeria had 55,256 miles of roads, of which 9,476 miles were paved. Both construction of more all-weather roads and rebuilding of some highways that are heavily used are considered of prime importance for efficient marketing of farm produce. Many roads are closed to traffic for several hours after rain begins to fall. Some fairly new trunk roads have only one paved lane. However, the dirt shoulders are well maintained and the roads carry traffic in both directions.

Nigeria's major rivers have road crossings at only four points--the Niger at Kainji Dam, Jebba, and Onitsha, and the Benue at Makurdi. The bridges at Jebba and Makurdi are combination railway-highway bridges; when a train is coming, the bridge is closed to other traffic.

NIGERIA: PRECIPITATION AND TEMPERATURE



Besides roads, footpaths are greatly important in marketing farm commodities; almost all such produce is carried on people's heads for at least part of the journey to market.

Railroads

In its rail system, Nigeria has 2,178 miles of railroad with a gauge of 3 feet, 6 inches. A western line runs from the coast of the Gulf of Guinea at Lagos through Ibadan, Ilorin, Jebba (where it crosses the Niger River), Kaduna, Zaria, and Kano, to the northern terminus at Nguru. There are two main branches, one from Minna to the Niger River port of Baro and the other from Zaria to Kaura Namoda in the cotton and peanut area.

An eastern line runs from Port Harcourt on the coast through Enugu, Makurdi (where it crosses the Benue River), Kafanchan, and Bauchi, to the northern terminus at Maiduguri. A short spur reaches Jos. During the recent civil conflict, the line from Port Harcourt to Kafanchan was closed. The western and eastern lines are connected by a railroad from Kaduna to Kafanchan.

A narrow-gauge rail line (2 feet, 6 inches) was opened in 1914 from Zaria via Jos to Bukuru to facilitate development of the tin mines, but this line has been abandoned.

Some of the larger towns not served by rail are Sokoto, Katsina, Calabar, Onitsha, Benin City, Ijebu-Ode, and Ogbomosho.

The railways carried about 8 million passengers and 1.6 million tons of freight in 1969. The railroads once carried practically all long-haul freight but in recent years have met increasing competition from trucks. Farm products, particularly peanuts and cotton, make up an important part of rail freight.

Ports

Nigeria's chief ports, Lagos and Port Harcourt, are reasonably well equipped for loading ocean freighters with farm products. Other ocean ports include Calabar (near the Cameroon border) and the Benin or Delta

ports of Burutu, Koko, Sapele, and Warri, which average 58 miles from the Gulf of Guinea. The Delta ports are partially blocked by sandbars. Bonny, near the mouth of the Bonny River, has been developed for loading petroleum tankers.

On April 20, 1970, Major General Yakubu Gowon, head of state and chairman of the Supreme Military Council, announced the Federal Government's plan to develop concurrently the four ports of Lagos, Warri, Port Harcourt, and Calabar for handling Nigerian exports and imports. As part of the project, new systems of trunk roads will be constructed leading to each port.

Rivers

One student of the African scene suggests that the Niger River may become the Rhine of Nigeria. River traffic now totals about 200,000 tons a year. From August to March, the Niger is navigable to Jebba, 566 miles from the sea. In low-water months, the river is navigable to Lokoja, 360 miles from the sea. For a few weeks a year, the chief tributary, the Benue, is navigable all the way to Garoua in neighboring Cameroon, 972 miles from the sea. In eastern Nigeria, boatmen bring export freight to Calabar via the Cross River (fig. 2). A network of navigable creeks near the coast makes it possible to move passengers and freight by water all the way from Dahomey to Eket, 60 miles from the Cameroon border.

Electric Power

To date, electric power has been insignificant in farm production. Electricity is more important in marketing and processing farm commodities. For example, the palm kernel oil plant at Ikeja has a rated capacity of 100,600 tons of kernels annually. However, in 1967, the plant could only crush 81,300 tons because of power reduction.

The Kainji Dam Electric Generating Plant on the Niger River is a major new source of power in Nigeria. The plant first transmitted electricity on December 22, 1968, and was officially opened in early 1969. At the present Nigerian



Figure 2.--Nigerian farm products get to market by various means, including ferries, such as this one on a river in South Eastern State near Calabar.

economic growth rate, this plant, along with older thermal plants, is expected to supply the country's electric power needs until 1980. Two additional hydroelectric plants are scheduled to go into operation, one in 1982. Total installed capacity of the three hydroelectric plants will be 1,730 megawatts.

POPULATION

The November 1963 census of Nigeria showed a population of 55,653,821, making the country the most populous in Africa. Results of the census, which favored northern Nigeria politically, were challenged by the governments of the eastern and midwestern regions. Various international and foreign organizations have also questioned the results and some have made their own estimates. The Agency for International Development (AID) estimated the population in mid-1970 at 56.5 million, with an annual growth rate of 2.7 percent.

Population density varies widely and averages 158 persons per square mile. The densest areas are Lagos State, East Central

State, and the main peanut- and cotton-growing areas of the north.

About 80 percent of the people live in villages and towns of less than 5,000 in population and may be considered rural residents. The typical Nigerian farmer lives in a village and not on the land he works.

Only about 40,000 of the people are non-Africans, or less than one-tenth of 1 percent. Five tribal groups make up 60 percent of the population--the Hausas, Kanuris, and Fulanis in the north; the Ibos in the east; and the Yorubas in the west.

AGRICULTURAL STRUCTURE

The typical Nigerian farmer cultivates 1 to 5 acres of land with his own labor and that of his family. Cocoa farmers in Western State may, however, manage as many as 30 acres. A few Government and private plantations have larger acreages.

Typically, the Nigerian farmer does not own his land in the sense of having a

legal deed or title to it. Land rights are administered according to local tribal customs and Nigerian law; these rights are held on a family or tribal basis.

Though the present system of land tenure has its disadvantages (such as limiting credit and investment), there are compensations. Nigeria has no significant absentee owner problem nor are there any huge holdings in the hands of rich or powerful families. However, the system of private land ownership is evolving. Some farmland is now held under freehold; it can be sold and a clear title given.

Nearly always, Nigerian farmers grow either crops or livestock but not both. However, a few thousand farmers in the northern States grow both crops and livestock. Though there is considerable subsistence farming (growing crops and livestock for one's own use), many thousands of Nigerian farmers produce yams, cassava, kolanuts, corn, sorghum, millet, and other crops which they sell to their neighbors or to markets. These markets are usually close by but can sometimes be hundreds of miles from the farms producing the crops. Many other farmers grow crops for overseas export.

PROGRESS IN FARM TECHNOLOGY

Nigeria lags in modern farm technology. For example, the peanut, cotton, and grain sorghum crops of the northern States are largely grown with hand labor--most of the land preparation, planting, cultivating, and harvesting are done with handtools, without work stock or tractor power. The main handtools used are the short-handled hoe, the machete (cutlass), and the sickle.

However, considerable progress is being made in mechanizing these crops. In the early 1960's, about 36,000 farmers in the northern States were considered diversified (or "mixed"); they raised 20 to 30 acres each of peanuts, cotton, and grain sorghum with work stock (two or four oxen per farm). By 1969, over 60,000 ridging plows were reported in use in the northern States by farmers raising these crops.

Ridging plows have double moldboards which throw the dirt in equal amounts to the right and left and are used to prepare

ridges for planting. In the southern United States, they would be called middle busters. Ridging plows are rather hard for two oxen to pull and there is a demand for implements of lighter drafts. An easier-to-pull ridging plow has been developed in Ghana but has not yet been widely distributed in Nigeria.

With the moldboards removed and a wide share attached, the plows make good peanut lifters. They cut the peanut taproots and loosen dirt beneath the plants so that the plants can be readily dug up, shaken free of dirt, and laid on the ground to dry. Few ridging plows are equipped as yet for this use.

Nigerian farmers with ox power could very profitably buy "horse hoes" for light cultivation; these implements are inexpensive and greatly reduce the necessity for hand weeding. Such cultivators are in wide use in Mali and Senegal but--so far--not in Nigeria. They consist of an animal-drawn tool frame, with attached sweeps or shovels for cultivating or weeding and two handles held by the farmer. Though not exactly comparable, they are similar in purpose and use to the "Georgia stock," once used by the millions by farmers in the southern United States.

In the northern States of Nigeria, hand operated peanut shellers are in common use. Powered by one or two men, these shellers rapidly remove the peanut hulls at a rate over 50 times faster than that for hand shelling.

Not much Nigerian land is irrigated. However, one of the benefits expected from the Kainji Dam was the impounding of water to be used for irrigation, possibly of rice and sugar. Now that the dam is completed, no word has been received of land being actually irrigated with this water.

For all practical purposes, Nigeria can be said to be a nonuser of commercial (mineral) fertilizers. Unofficial estimates published by the Food and Agriculture Organization (FAO) show that Nigeria in 1967/68 used 5,000 tons of nitrogen, 2,200 tons of phosphate, and 1,200 tons of potash (all plant nutrient basis). On the average, less than 1 pound of plant nutrient would be used per acre in field crops. No fertilizer is manufactured in Nigeria.

Diseases, insect pests, and rats often severely damage crops in the field and in storage. The *Quelea quelea* (weaver birds) also cause heavy losses of small grains in some parts of the country. So far, control measures have been taken almost exclusively against plant diseases and pests of cocoa and coffee. Pesticides of various kinds, all imported, are used on these two commercial crops.

Nigeria has made considerable progress in selecting and breeding new and improved varieties of planting material that are adapted to various parts of the country. It also has promoted use of some of these varieties by distributing them at subsidized prices to growers of corn and various cash crops, including cocoa, cotton, African oil palms, peanuts, coffee, kolanuts, and citrus fruits and other fruits. Distribution programs for cocoa and cotton farmers have been underway for some years and have benefited many growers. For example, improved Amazon cocoa seedlings distributed at highly subsidized prices in Western State alone have averaged about 10 million seedlings per year since 1960. In addition, improved cottonseed, distributed free of charge in the northern States, reached 18,000 tons as early as 1961.

Except for cocoa and cotton, however, seed multiplication and distribution systems have apparently not yet been developed on the scale needed to encourage widespread use of improved varieties either for cash or subsistence crops. The average farmer simply saves seed from his crop. Usually the best-looking produce is sold, instead of being kept for seed; genetically, the crop is gradually degraded. Drying and storing seed to preserve viability is especially difficult in the south. The hot, humid climate causes a rapid rate of respiration in stored seed which is conducive to the growth of fungi and insects.

Not much progress has been made in scientific animal breeding and selection and livestock production practices. Perhaps the most progress has been made with hogs and poultry. (Also see Livestock and Livestock Products).

AGRICULTURAL RESEARCH, EDUCATION, AND EXTENSION

The Federal Department of Agricultural Research has its headquarters, laboratories, and some test plots at Moor Plantation, 4 miles west of Ibadan. The Department is responsible for research in staple crops grown in all parts of Nigeria. Mainly being studied are yams, cassava, corn, rice, pulses, and citrus fruits. The Department also maintains the Rice Research Station at Badeggi (in North Western State), which, in turn, has substations at Birnin Kebbi, also in North Western State, and at Bende in East Central State. There is also a substation at Umudike in East Central State which carries out investigations into root crops, corn, and legume breeding and agronomy.

At Moor Plantation, the Western State Research Division operates a 300-acre agricultural research station. Also at Moor Plantation is the administrative headquarters of the Cocoa Research Institute of Nigeria (CRIN). The main experimental groves and laboratories are on 760 acres of the northern portion of Gambari Forestry Reserve at Idi-Ayunre, 14 miles south of Ibadan on the road to Ijebu-Ode. Formerly concerned only with cocoa, CRIN initiated research on coffee and kolanuts in 1964.

A new research organization, the International Institute of Tropical Agriculture (IITA), was recently started near the University of Ibadan. IITA is generously endowed by the Ford and Rockefeller Foundations and is also financially supported by AID, the Kellogg Foundation, Canada, the United Kingdom, and the Federal Government of Nigeria. It will serve tropical areas in and outside Nigeria. IITA was formally dedicated in April 1970.

Valuable agricultural research has been done by the Nigerian Institute for Oil Palm Research (NIFOR), located 20 miles north of Benin City, Mid-Western State.

The Nigerian Stored Products Research Institute has its headquarters in Lagos.

One of Nigeria's new agricultural research facilities is the 3,000-acre agricultural experiment station at the University of Ife at Ife, Western State. Research is planned in animal, plant, and soil sciences.

In northern Nigeria, a wide range of crop research is conducted by the Institute for Agricultural Research at Samaru, near Zaria. The institute is now affiliated with Ahmadu Bello University.

Up to the late 1960's, livestock and dairy research was largely concentrated at Vom in the Jos Plateau, Benue Plateau State. A college of veterinary medicine has now been established at Ahmadu Bello University at Zaria.

Nigeria has colleges of agriculture at four of its five universities, described below.

The University of Ibadan was formed as a federal university. Located at Ibadan in Western State, it is the oldest of Nigeria's universities.

The University of Nigeria was established as the university for the former Eastern Region. It is located at Nsukka and Enugu, East Central State. The college of agriculture has been assisted by Michigan State University, East Lansing, Mich., under a contract with AID. The University of Nigeria was closed during the civil conflict and has since reopened.

Ahadu Bello University was established as the university for the former Northern Region and is at Zaria in North Central State. Its colleges of agriculture and veterinary medicine are being assisted by Kansas State University, Manhattan, Kans., under a contract with AID.

The University of Ife, established as the regional university for the Western Region, is at Ife and Ibadan, Western State. Its college of agriculture is being assisted by the University of Wisconsin, Madison, Wis., under an AID contract.

ECONOMIC AND TECHNICAL ASSISTANCE

Nigeria is one of the "concentration countries" receiving major economic and

technical assistance from the United States. From 1946 to 1969, U.S. grants and loans to Nigeria totaled \$288 million dollars. Other important donors of bilateral aid were the United Kingdom (\$176 million for 1960-68); West Germany, \$32 million; Italy, \$30 million; and other countries, \$36 million.

Assistance to Nigeria from international organizations during 1946-69 included \$206 million from the International Bank for Reconstruction and Development (World Bank), \$36 million from the International Development Association, and \$20 million from the U.N. Development Program Special Fund.

U.S. aid to agriculture has been concentrated in agricultural education, research, and extension; land and water resources; crop and livestock development; and agricultural economics and credit. U.S. aid in nonagricultural fields has been directed mostly toward education, public administration and planning, industrial development, engineering, infrastructure and public service (highways, telecommunications, and electric power), and health and sanitation.

The civil war in Nigeria began in July 1967 and ended in January 1970. Some resulting emergency needs for food and medical services were met by contributions from international organizations and governments and private (church and secular) organizations in many countries. Among these were the United States, Canada, countries in Africa and Western Europe (including Scandinavia). Logistic difficulties and dissension about means and routes of delivery made some aid less effective than desired.

AGRICULTURAL PRODUCTION

Crops

Nigeria is the world's largest producer of several crops, including palm oil and kernels, African yams, cowpeas, and kola-nuts. It is the world's largest exporter of peanuts, the second largest producer of cocoa, and a significant producer of cotton, rubber, cassava (manioc), cocoyams, sorghum, millet, and other crops (table 1).

Table 1.--Production of principal crops, Nigeria, average 1962-64, annual 1968, 1969, and 1970

Crop	1962-64 average	1968	1969	1970
----- 1,000 tons -----				
Export:				
Peanuts, in shell.....	1,387	1,445	1,365	780
Palm oil.....	511	370	425	480
Palm kernels.....	399	225	265	300
Cocoa beans.....	232	195	225	300
Cottonseed.....	96	115	177	89
Rubber, crude.....	65	53	57	61
Cotton lint.....	48	60	91	38
Soybeans.....	19	7	33	25
Sesame seed.....	22	13	25	20
Domestic use:				
Yams.....	11,563	11,481	11,814	11,800
Cassava (manioc).....	9,813	8,128	9,500	9,144
Sorghum.....	3,653	3,455	3,700	3,556
Millet.....	2,947	3,201	3,566	3,048
Cocoyams.....	1,311	1,499	1,539	1,544
Plantains and bananas.....	1,665	1,219	1,270	1,270
Corn.....	1,147	1,219	1,200	1,000
Cowpeas and other beans and peas....	439	520	700	600
Rice, paddy.....	362	376	387	509
Kolanuts.....	140	132	130	132
Sugar, raw.....	0	34	36	43
Tobacco.....	11	12	10	12

Chiefly because of variations in rainfall, different sections of the country specialize in certain crops. For example, cocoa is grown mostly in the southwest, yams and oil palm products in the southeast, and peanuts, cotton, millet, and sorghum in the north.

Twenty-six of the more important crops are discussed in detail below--chief export crops in the order of 1969 export value and chief domestic crops in the order of estimated 1970 production (figs. 3 and 4).

Cocoa

Nigeria is considerably behind the world leader, Ghana, in production of cocoa beans, but ahead of the former second-place producer, Brazil. In 1970, Nigeria produced 20 percent of the world's cocoa beans, mainly in Western State in an area

lying between the savanna area to the north and west and the high rainfall areas of the southeast.

Most cocoa trees in Nigeria are Amelonado (originally from Jamaica and South America), the world's most common type of cocoa tree. They begin to bear at 4 to 5 years of age, reach full maturity at 12 to 15 years, and start declining in productivity after they are about 35 years old. Nigeria has a large percentage of cocoa trees over 35 years old and thus needs to rapidly replace them.

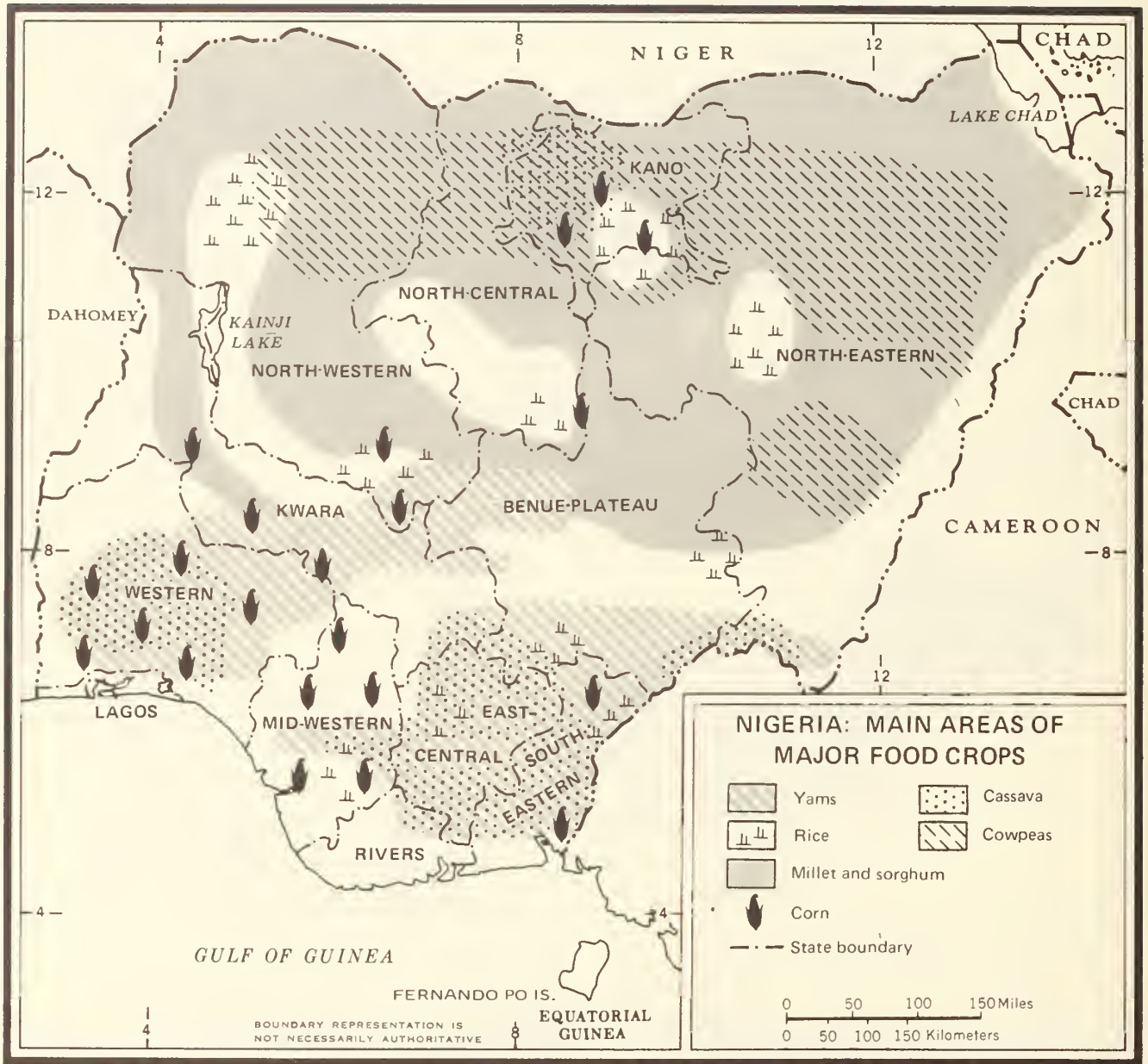
Farmers who wish to establish new cocoa plantings usually clear the primary or secondary forest in single or scattered plots, leaving a sufficient canopy of trees (often including wild African oil palms) to provide basic shade. Sometimes farmers plant bananas or kolanut trees for



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Figure 3



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Figure 4

an additional lower canopy for young cocoa trees, and usually they grow food crops as well. The typical cocoa farmer has not only cocoa as a cash crop but other tree and field crops to help feed his household.

The main cocoa crop is harvested from October to January and a light crop, from May to August. The pods, which develop on the tree trunks and main limbs instead of on the leafy branches, must be cut off individually. Pulling the pods would damage the fruiting cushion which produces flowers for next year's crop (fig. 5). The pods are about the size and shape of a child's football and are yellow when ready to be harvested.

After the pods are cut open, the beans are scraped into a clean basket, wrapped in banana leaves or placed in special boxes, and allowed to ferment about 6 days. The beans are then dried in the sun on raised platforms.

Until recently, all cocoa beans were exported without further processing. However, in 1967, a cocoa processing plant with a grinding capacity of 30,500 tons of beans per year was opened at Ikeja, near Lagos. It produces cocoa butter and cocoa cake; most of these cocoa products are exported.

Black pod disease has been the most serious enemy of cocoa in Nigeria; as the name indicates, it is a fungus which attacks the cocoa pods. Another pest, the capsid insect, causes more damage than black pod in some years. The capsid feeds on cocoa and other plants by piercing the branch or pod to extract its food. This act in itself does no great damage, but the resulting lesion is an ideal host for a fungus infection that causes whole branches to wither and rot. The combination of capsid and fungus is particularly serious for seedlings or young trees by retarding their maturity for several years or preventing them from becoming established at all. Capsids can be controlled effectively under west African conditions with insecticide sprays. Measured use of sprays can bring rapid and substantial increases in yields.

Still a third pest--swollen shoot--is a virus disease of the cocoa tree. The internodes swell and begin to die back from the young twigs. Carried from tree to tree

by mealybugs, the disease rapidly reduces production and eventually kills the tree. Two cocoa areas, near Ibadan and south of Abeokuta, are called "areas of mass infection." However, swollen shoot in Nigeria is not as serious as it is in Ghana.

Prospects for cocoa appear bright. About a million to 1.5 million acres in Nigeria are now in cocoa trees and the soils on an additional million acres are thought suitable. More extensive plantings of cocoa, coupled with better care of the trees and more efficient harvesting and fermenting should considerably increase production in the years ahead. Furthermore, the general world outlook for cocoa continues good. On the average, production and demand are well matched.

Cocoa beans are purchased by the marketing boards on a monopoly basis at a constant price announced in advance of the marketing year (October 1 to September 30). For the 1970/71 season, the buying price for Grade I beans was N£155 per long ton (\$434 per long ton, or 19.38 cents per pound). Grade II beans were purchased for N£140 per long ton (\$392 per long ton, or 17.50 cents per pound). The average export value shown in table 2 is for the calendar year following the marketing year; for example, during marketing year 1958/59, the price paid farmers for cocoa beans was 18.75 cents a pound, compared with the average export value of 33.51 cents a pound received during calendar year 1959. All cocoa sales are subject to a "produce sales tax" of N£4 (\$11.20) per long ton, which is deducted by licensed buying agents of the marketing boards.

Peanuts

Nigeria is the world's largest exporter of peanuts. In 1969, exports of peanuts and peanut products amounted to 34 percent of agricultural exports and 16 percent of all exports. As a producer, Nigeria is in third place after India and Mainland China.

Parts of northern Nigeria are well suited for growing peanuts. Annual rainfall of 25 to 40 inches is concentrated in the summer months. Peanuts are planted to



Figure 5.--Harvesting cocoa pods. Nigeria is the world's second largest grower of cocoa beans. Most of the cocoa trees are found in Western State. (Photo by Federal Ministry of Information, Lagos.)

Table 2.--Cocoa beans: Prices paid farmers per pound compared with average export values, Nigeria, 1959-69

Year	Price paid farmers, marketing year ending September 30	Average export value, calendar year	Price paid farmers as percentage of average export value
	Cents	Cents	Percent
1959.....	18.75	33.51	56
1960.....	20.00	29.81	67
1961.....	20.00	22.94	87
1962.....	12.50	21.41	58
1963.....	13.12	23.17	57
1964.....	13.75	25.47	54
1965.....	15.00	17.74	85
1966.....	8.12	18.57	44
1967.....	11.25	27.99	40
1968.....	11.88	31.46	38
1969.....	12.50	38.48	32

Source: Sugar and Tropical Products Div., For. Agr. Serv., U.S. Dept. Agr.;
FAO Trade Yearbook.

grow during this rainy season. The dry period that follows allows for maturing and harvesting under favorable conditions. In light Northern Drift soils, the nuts can be grown and harvested easily. On the southern fringes of the peanut belt, the Zaria-type soils are somewhat heavier and peanut yields are slightly smaller.

The huge Nigerian peanut crop is grown largely by hand. The crop is planted from mid-May to mid-June and is ready for harvest in October and November. After the rains have ceased, the peanut plants are dug up, shaken to remove the soil, and left on the ground to dry a day or two. Still in the shell, the peanuts are plucked off the plants and dried further at the farmer's compound (fig. 6). Workers remove the shells by pounding the nuts in a mortar with a pestle, or by using a small, hand-powered shelling machine. Nigerian peanuts are nearly always marketed as shelled nuts.

The marketing boards, which purchase peanuts on a monopoly basis, fix the price in advance of the marketing year (November 1 to October 31). The average export value shown in table 3 is for the ensuing calendar year; for example, during the marketing year 1959/60, the price paid farmers for shelled peanuts was 4.54 cents a pound,

compared with the average export value of 8.62 cents a pound received during calendar year 1960.

Some growers deliver their peanuts to the buying stations. However, most growers sell through middlemen. These middlemen may be agents financed by the buying agents and trading companies, they may be independent traders, or they may be part-time traders and peanut growers. At the stall or store established by the licensed buying agent, the peanuts are sampled, weighed, and bagged.

Most of the bagged peanuts are assembled at Kano and stored in the open in giant pyramids. A cheap and efficient form of storage in the north, these mounds need covering with tarpaulins only in the short rainy season. Effective control measures keep down losses from rats, mice, and insects. As railroad freight cars and highway trucks become available, the peanut pyramids are torn down and shipped to Lagos for export. Before the civil war, a significant portion of the crop was exported through Port Harcourt.

From year to year, an increasingly larger part of Nigeria's peanut crop is crushed for oil and oilcake within the



Figure 6.--Removing peanuts from the mature plants by hand. (Photo from Regional Research Station, Samaru.)

Table 3.--Shelled peanuts: Prices paid farmers per pound at Kano buying station compared with average export values, Nigeria, 1960-69 ^{1/}

Year	: Price paid farmers, : : marketing year : : ending October 31 :	Average : export value, : calendar year :	: Price paid farmers : : as percentage of : : average export value
	: Cents :	: Cents :	: Percent
1960.....	4.54	8.62	53
1961.....	4.68	8.16	57
1962.....	4.21	7.78	54
1963.....	3.79	7.45	51
1964.....	3.79	7.87	48
1965.....	4.08	9.23	44
1966.....	4.28	8.91	48
1967.....	4.28	8.20	52
1968.....	3.62	7.44	49
1969.....	3.25	8.66	38

^{1/} Before 1969, the price announced by the marketing board was actually the board's price for peanuts at the port. Prices paid to farmers shown here were derived by deducting the cost of shipping from Kano to the port (for example, 0.98 cents per lb. in 1968) and a produce sales tax (for example, 0.19 cents per lb. in 1968). In 1969, the board began announcing the actual price paid farmers for peanuts, whether at Kano or another buying station.

Source: Foreign Agriculture Circular (Fats, Oils, and Oilseeds), annual issues on peanuts; FAO Trade Yearbook.

country. As of early 1970, Nigeria had seven peanut crushing mills, of which five were in Kano, one in Maiduguri, and one in Zaria. Together, these plants have an annual crushing capacity of 457,000 tons of shelled peanuts. Most of the peanut oil and oilcake are exported, nearly all to the United Kingdom.

In addition, in five of the seven mills, there are handpicked selections of peanuts for export as confectionary nuts. Unselected nuts are crushed for oil. Also, there are four plants in which peanuts are selected by hand--three in Kano and one in Maiduguri--that are operated independently of the crushing plants. These four plants sell unselected nuts to the mills for crushing.

Fortunately, Nigerian peanuts do not suffer much from Aspergillus flavus, a harmful mold which produces aflatoxin and has been discovered in peanuts in recent years.

The future of Nigerian peanuts appears reasonably promising, assuming that local prices remain favorable to the growers. The crop could be readily mechanized; however, several hundred thousand peanut farmers would then be unemployed. The resulting sociological problem might outweigh the technological advance. For the foreseeable future, Nigeria's great peanut crop will probably continue to be grown and harvested by hand.

Palm Oil and Palm Kernels

For a number of years, Nigeria has been the world's largest producer of palm oil. Large new oil palm (Elaeis guineensis) plantations in Malaysia enabled that country to reach second place after Nigeria in production of palm oil in 1970. Nigeria continues to be the world's largest producer and exporter of palm kernels and the second largest exporter of palm kernel oil.

Most Nigerian oil palms are found in the three States (East Central, Rivers, and

(South Eastern) that formerly comprised Eastern Nigeria. Large numbers of trees are also found in Mid-Western State, Western State, and Lagos State. Some palms are found on the southern fringe and along streams in the northern States.

The African oil palm is a perennial that yields several bunches of fruit in the crown of the tree. A bunch may contain 200 to 2,000 fruits, each about 2 inches long and 3/4 inch in diameter. The fruit has three main parts: (1) the outer fleshy pulp, or pericarp, which contains the palm oil; (2) a hard-shelled palm nut enclosed by the pericarp; and (3) the palm kernel, inside the nut, which yields palm kernel oil and palm kernel cake. The fibrous residue remaining after the palm oil has been extracted from the pericarp is of little value, and is often used for fuel in the oil mill. Shells of the palm nuts are also used as fuel. Palm oil is high in palmitic acid; palm kernel oil is high in lauric acid.

The oil palm requires a warm, humid climate with an annual average temperature near 68° and an altitude of less than 2,000 feet. It needs plenty of sunshine; areas with too much cloud cover are not suitable.

Nearly all Nigerian oil palms grow wild or semiwild. They grow scattered or in groves on cultivated or fallow lands, around village and farm compounds, and along paths. Plantation culture is confined to about 16 small plantations, one European-owned and the others owned by the southern development corporations. For plantation plantings, palm seeds are usually started in warm ovens and sprouted in boxes. The seedlings are grown for several months in a nursery and finally transferred to the groves. All plantations combined had only about 44,500 acres in oil palms in 1965, or under 1 percent of the total palm area.

Palm oil is by far the most valued product of the oil palm. It is an impor-

Table 4.--Palm kernels: Prices paid producers per pound in the former Eastern Region compared with average export values, Nigeria, 1959-68 ^{1/}

Year	Price paid farmers	Average export value	Price paid farmers as percentage of average export value
	Cents	Cents	Percent
1959.....	3.62	7.53	48
1960.....	3.62	7.79	46
1961.....	3.25	6.05	54
1962.....	3.12	5.76	54
1963.....	3.12	6.53	48
1964.....	3.38	6.65	51
1965.....	3.38	7.98	42
1966.....	3.62	7.12	51
1967.....	3.62	6.00	60
1968.....	<u>2/</u>	8.00	n.a.

Note: n.a. means not available.

^{1/} Marketing year is same as calendar year.

^{2/} No official price because of civil war.

Source: General Agreement on Tariffs and Trade: The First Six-Year Plan; FAO Trade Yearbook.



Figure 7.--Much of the processing at the palm kernel oil plant at Ikeja is automated except for unloading the bags of palm kernels from highway trucks. (Photo by Mrs. Wynona L. Skinner.)

tant domestic food crop in the six southern States and to a lesser extent in the six northern States. Palm oil is also a major export crop in the three southeastern States which supply nearly all of the exported palm oil (table 4). Palm oil is processed from the palm fruit by several methods, which vary in degree of technology, percentage of oil extracted, and quality of oil produced.

Palm kernels are a byproduct of palm oil production. They are mostly hand shelled by women and children, who have traditional claims to the money receipts. Formerly, palm kernels were virtually all exported. Since the opening in late 1965 of a huge modern crushing plant at Ikeja, near Lagos, the palm kernels produced in Western and Lagos States have been crushed in Nigeria and the resulting oil and cake have been exported (fig. 7). A proposed crushing plant at Port Harcourt was not completed because of the civil war. Now that the war is over, construction may proceed.

Palm wine, another product of the oil palm tree, is made by fermenting sap obtained by tapping the trunk.

Oil palms appear to have a great future in Nigeria. Improved varieties set out in plantations could greatly increase production of both palm oil and kernels. However, increasing competition from other oil palm-producing countries and from other fats and oils may keep such new plantings from being as profitable as desired.

Rubber

Nigeria ranks about sixth among the world's rubber producers and first among the African nations (fig. 8). Other major rubber producers on the continent include Liberia, the former leader in African rubber production; and the Congo (Kinshasa). Nigerian rubber production was seriously affected by the civil conflict. Normally, the country produces nearly 3 percent of the world supply, mainly in Mid-Western State.

Rubber trees generally require a hot climate (annual range of 70° to 90°) with frequent rains (80 to 120 inches) throughout the year. However, some strains have been developed which can stand several



Figure 8.--Transplanting a rubber seedling. Nigeria is usually Africa's largest producer of natural rubber. (Photo from U.S. Agency for International Development.)

months of dryness. Rubber grows in areas lying within 6° of the Equator and under 1,250 feet in elevation. In Nigeria, such land lies within 50 miles of the coast but also extends some 500 miles along the seashore.

In the early years of Nigeria's rubber industry, indigenous rubber-bearing plants were tapped, notably the tree Funtumia elastica. The Para rubber tree (Hevea brasiliensis), on which the world's natural rubber industry is now based, was introduced experimentally in the Lagos area in 1895. Ten years later, a commercial plantation of these trees was planted near Sapele. Today, this type has almost entirely supplanted Funtumia as a source of rubber in Nigeria.

At about 6 or 7 years of age, Hevea trees are tapped for their sap, somewhat as pines are tapped for turpentine or maples for sugar. The bark is lightly slashed and the sap (latex) collected in small cups attached to the tree. Cuts need to be made carefully and regularly, possibly every morning. In practice, rubber tapping in Nigeria has often been crudely done and the trees have been damaged.

Rubber is the most plantation-oriented farm product; and about one-sixth of Nigeria's rubber production comes from six plantations in the Benin-Warri area. The remainder is from small holdings. Usually, plantation rubber trees get better care than those on the small farms.

On the plantations, the latex is taken to a coagulating plant. There, it is thinned with water and formic or acetic acid added. Vertical separators or baffles are placed at close intervals in the coagulating vat. The latex hardens into sheets which are then kneaded, washed, dried, and graded for shipment.

Most of Nigeria's rubber is exported, but some is used in tire factories at Port Harcourt and Ikeja, near Lagos; in local tire-recapping plants; and in shoe manufacture.

Since the civil war is over, rubber production should now be able to continue expansion. The world price of rubber will probably affect rubber production more than local factors.

Cotton

Nigeria grows the most cotton of any country in west Africa but is far down the list of world cotton producers.

Cotton requires good, heavy loam soils; regular rains and considerable sunshine during the planting and growing season; and dry weather to ripen the crop and allow harvest. Peanuts and cotton compete somewhat in northern Nigeria but usually, when there is a choice, peanuts are planted in the lighter textured soils and cotton on the heavier soils.

In Nigeria, cotton is grown most extensively in three of the most northern of the new States--North Central, North Western, and North Eastern. The railway was extended to Maiduguri to increase northeastern production of cotton and peanuts located within truck-hauling distance.

Two chief types of cotton are grown. In the drier north, Allen cotton (Gossypium hirsutum) is cultivated. Allen is an American type introduced from Uganda many years ago (but within this century). It flowers over a relatively short period and has large cotton bolls. The fiber is long and fine but weak. For a time, an improved Allen known as Samaru 26C was in wide use but it has now been replaced by 26J (Nigerian Allen).

The other species, Ishan cotton (Gossypium vitifolium), is grown to a small extent in the south. It flowers over a longer period than Allen cotton and produces a staple that is long, strong, and coarse.

Best yields are obtained when cotton is planted the first half of July. Six to eight seeds per hill are planted and then thinned to one to three plants. Cotton picking (harvesting) comes in December and January in the main producing areas. All these steps of soil preparation, planting, cultivation, and harvesting are usually done with handtools.

About 34 percent of the seed cotton is lint (fiber). Seed and lint are separated at a number of gins located at Gombe, Zaria, Gusau, Funtua, Mallamfushi, Mai Inchi, Kumo, Kontagora, Kuru, Lamurde,

Lokaja, Misau, and Keffi. The fiber is packed in bales of about 400 pounds each.

Formerly, Nigerian cotton lint was practically all exported. In recent years, more spinning, weaving, and dyeing plants have been built and an increasingly large part of the cotton crop is manufactured for local use. Several textile mills are located at Kaduna (North Central State). Several others are in or near Lagos and others have been built at Aba (East Central State), Ado-Ekiti (Western State) and Asaba (Mid-Western State). Together, these mills now use around 175,000 bales (480 pounds net) annually. A new mill is under construction at Zaria, in North Central State.

Cottonseed, which constitutes about two-thirds of the seed cotton, can be pressed for a high-quality edible oil. The remaining cake or meal is a good protein supplement for cattle and sheep and can also be used for fertilizer. However, up to now, there has been no crushing of cottonseed in Nigeria. Some is saved for planting the following year's crop, some fed uncrushed to cattle on Government farms, some

used for boiler fuel at the cotton gins, and the remainder is exported uncrushed.

Though the cotton is afflicted by a number of insect pests and diseases, production does not seem to be greatly affected. Nigeria is fortunate in not having the Mexican boll weevil. The main measure taken against insects and diseases is uprooting and burning the cotton plants once harvest is complete. This practice prevents carryover of insects or disease organisms which would affect the new crop.

Nigerian cotton production will probably continue to rise slowly. However, exports may stop completely if capacity of local textile factories increases more rapidly than production.

The price paid farmers for unginning cotton is fixed by the marketing boards in advance of the marketing year, which extends from August 1 to July 31 (table 5). The average export value is for the ensuing calendar year; for example, during the marketing year 1958/59, the price paid farmers for unginning cotton was 7.12 cents a pound, compared with the average export

Table 5.--Unginned cotton: Prices paid farmers for Grade NAL compared with average export values, Nigeria, 1959-69

Year	: Price paid farmers, : marketing year : ending July 31	: Average : export value, : calendar year	: Price paid farmers : as percentage of : average export value
	: <u>Cents</u>	: <u>Cents</u>	: <u>Percent</u>
1959.....	7.12	8.57	83
1960.....	7.23	9.78	74
1961.....	7.23	9.86	73
1962.....	6.42	10.71	60
1963.....	5.78	10.12	57
1964.....	5.78	10.30	56
1965.....	6.01	10.39	58
1966.....	6.13	9.83	62
1967.....	5.89	8.38	70
1968.....	5.54	9.89	56
1969.....	7.21	10.17	71

Source: Nigerian Produce Marketing Company and FAO Trade Yearbook.

value of 8.57 cents a pound received during calendar year 1959.

Prices are for Grade NAL. Average export values include all grades. For easy comparison in the table, average export values have been converted from a ginned to unginning basis through use of a ginning turnout factor of 34 percent. Average export values do not include any allowance for the value of cottonseed.

Sesameseed

Production of sesameseed for export is concentrated in Benue Plateau State, where it is an important cash crop for the Tiv people. Throughout the drier, cultivated areas farther north, small patches are grown, apparently to provide cooking oil or serve as a condiment for local use.

Two types of sesameseed (locally called benniseed) are produced in Nigeria: the white-seeded type, which is preferred for export; and the black-seeded type, which lowers the export value when mixed with the white. Sesame is grown as a single crop away from the forest regions in areas where the seed can ripen without too much rain damage in August and September. Harvesting is done in September and October.

Sesameseed is valued for its edible oil content. The seeds contain 52 to 53 percent sesame oil.

Soybeans

Although soybeans were not introduced into Nigeria until World War II, they became, like sesameseed, an important cash crop for the Tivs by the mid-1950's. The crop also grows well in the heavier soils of the Zaria area.

Though the main sesameseed and soybean areas coincide, there is little direct competition between the two crops. Soybeans are normally planted on newly broken fallow in July and August; sesameseed is usually planted with the first rains on land previously occupied by soybeans or corn. The soybean crop is said to suffer little from fungus or insect attacks.

Yams

Based on limited and uncertain data, it appears that yams are Nigeria's major food crop and that Nigeria is, by far, the largest yam producer in Africa--and in the world (fig. 9).

Yams grow best in warm, humid climates, especially in areas of heavy rainfall. Thus, in Nigeria, the crop is grown mostly in the southern States.

Three main kinds are grown--white, yellow, and water yams. Though white yams are the most popular, the water yams contain more protein than the other two types. Other kinds include the trifoliolate, Chinese, and bulbil yams. There are many varieties of all six kinds. None are the same as sweetpotatoes.

Generally, yams are planted in hills 3 to 5 feet high and 3 to 4 feet apart. The small so-called seed yams are used for planting--or the larger food yams may be cut into seed pieces, much in the manner of planting Irish potatoes. From a half-ton to a ton of seed per acre is required, thus greatly reducing the proportion of the yam crop available for food.

Planting is done in November or in February and March. The vines must be trained onto stakes, cornstalks, or standing trees; otherwise, yields will be greatly reduced. The yams themselves grow underground in the hills.

Harvest comes about 8 months after planting. The harvest is done with the ever-present and ever-useful hoe. Yams must be carefully stored in the farmer's compound and inspected regularly to take out any which go bad.

Yams will probably continue as an important food crop in Nigeria and may increase as population rises. However, yams seem to be losing some ground to cassava, which is easier to grow. Also, none of the edible portion of a cassava crop must be used as regenerative material for the following year's crop.



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Figure 9.--A familiar scene in Nigeria--an open-air market. Yams and okra are displayed for sale. (Photo by Federal Ministry of Information, Lagos.)

Cassava

Cassava, or manioc, thrives in areas with hot weather and a wide range of annual rainfall; thus, it is grown all over Nigeria. Yams are limited to the better watered southern areas. Cassava does well in most soils; and in altitudes up to 3,500 feet, which includes most of the country.

Planting is done with pieces of stalk about 8 to 12 inches long. Since the stalk has no food value, cassava plantings use up none of the previous season's food crop. Cultivation consists of two or three weedings. Harvesting is done by digging with hoes. However, if not needed, the cassava tubers may be left in living storage in the soil, especially in the drier areas.

Since cassava contains poisonous hydrocyanic acid (also called prussic acid) in the tubers, especially the peel, roots must be carefully processed to remove the acid. In preparing gari, one of the products of cassava, the peeled, fresh tuber is washed and grated in a coarse, locally made, flat-shaped tin grater. The pulp is then collected in a rough knitted bag and pressed down with stones or other heavy objects for 2 or 3 days. During that time, the bulk of the moisture is lost, along with a certain amount of hydrocyanic acid. The final slow drying process (over a fire) eliminates the poison.

Though a good carbohydrate food, cassava is poor in other nutrients, such as fat and protein. Production, however, will probably surpass that of yams, as mentioned. Cassava gives large yields under less exacting conditions, takes less labor, and requires none of the old crop to plant the new crop.

Grain sorghum

Called Guinea corn in Nigeria, grain sorghum is the most important grain crop. Limited data indicate that Nigeria accounts for about half of the grain sorghum produced in Africa. The country grows about a fifth as much as the United States, the world leader.

Sorghum grows best with annual rainfall of 25 to 50 inches, but crops can be

produced with 15 inches of rain a year. More rain is required than for millet but less than for rice or corn. Sorghum and millet are often planted in alternate rows. Most grain sorghum grows in North Western, North Central, Kano, and North Eastern States. Lesser quantities are grown in Benue Plateau and Kwara States.

In the far north, most types are planted in May and June when the rains begin; and farther south, in June and July. The grain is harvested in the dry season, in December and January, after it has dried on the stalk for 2 months. Growers often lose some of the harvest to flocks of birds. Farmers hire boys to drive away the birds or use various scaring devices. The stalks are bound into sheaves and carried home where the larger part of the crop is stored unthreshed. Threshing and pounding are done by hand and the pounded grain is made into porridge and cakes. "Dwana," a fermented food, is another favorite use of sorghum grain. Sorghum is richer in protein than other grains commonly grown in Nigeria.

Fara-fara, the main local type, has white grain, and is used almost exclusively for food, as are most other Nigerian-grown sorghums. Some types are "malted" for brewing native beer. Others are fed to livestock. Stalks that grow to a height of 9 to 12 feet are useful for building houses and temporary shelters and for fuel, fencing, and fodder. Some varieties have shorter stalks.

Millet

The popularity of millet results from its ability to germinate with only a small amount of rainfall and to thrive with little rain during its growing period of 3 months or more. Millet can apparently withstand drought better than any other grain.

Thus millet is chiefly grown along the northern border of the country (in North Western, North Central, Kano, and North Eastern States), north of 12° north latitude. In this area, the 3-month variety (Pennisetum typhoideum) is planted. A variety (Pennisetum spicatum) with a growing season of 5 months or more is planted far-

ther south. The grain is often grown with cowpeas or peanuts.

Nigeria's second most important cereal after grain sorghum, millet is planted with the first spring rains in late April or May. The small size of the millet seed makes the crop an easy prey to the small, finch-like weaver birds.

At harvesttime, the stalks are cut down and shocked to dry. When well dried, the heads containing the grain are cut (leaving about 6 inches of stalk) for storage and further drying indoors or for immediate use. Harvest extends over several months, beginning with early maturing varieties in July and continuing each month until November, when the last harvests of late maturing varieties are made.

Millet is used for food and home-made beer. None is exported. It is especially useful for food because it matures earlier than other slower growing food crops, such as sorghum and corn. Thus, millet is available during the "hungry period"--several weeks of relative scarcity which often precede the harvests of the main food crops. Millet also has more protein than root crops, such as yams and cassava.

Because of its ability to mature with little rainfall, its ripening when food is needed most, and its high protein content, millet is likely to continue to be grown in quantity and production will probably rise along with population.

Cocoyams

Cocoyams are the third most important root crop in Nigeria. Two types are grown--tania and taro.

The crop thrives in rich alluvial soils in the hot moist climate of the rain forest regions. A high rainfall and a long wet season are required; thus, cocoyams do best in southeastern Nigeria, although some grow in swampy areas of the northern States.

Cocoyams have huge "elephant ear" leaves and produce food in the form of underground corms. After they mature in 6 to 8 months, the corms must be dug up at once to prevent deterioration. Their rough,

fibrous outer coating is removed and they are roasted, boiled, or pounded. In certain areas of Nigeria, the corms are used as an article of domestic commerce; none are exported.

Cocoyams are more nutritious than most other tubers; for example, they contain more protein, minerals, and vitamins than white potatoes. The starch grains are fine, easily digested, and of good flavor.

Plantains

Plantains are the most important fruit grown in Nigeria. Farmers in the southern States grow them solely for domestic food.

Though plantains will grow in a wide belt 30 degrees north and south of the Equator (such a belt covers most of Africa), these fruits are rather demanding about other growing conditions. The plants need good soils, average annual temperature of about 68° F., annual rainfall of about 40 inches evenly and gently distributed throughout the year, full sunshine, and no frosts or strong winds. Because plantains require rich soils, Nigerians plant them near their dwellings--preferred positions because the soil is constantly enriched by refuse of all kinds. Also, after a dense forest is cleared, plantains are planted first, when the soil is most fertile.

Propagation is by means of shoots taken from an old clump of rhizomes. The rhizomes themselves may also be used as planting material.

Plantains are rather unusual as they have no authentic stem or trunk. From a long-lived root grow great leaves which curl tightly to form a sheath or pseudo-trunk. From this sheath grows a long flower stem, bearing male flowers on the end, bisexual flowers in the middle, and female flowers at the base. The female flowers develop into the actual plantain fruits, which are large, coarse, thick-skinned, and spaced wide apart in "hands." Starchy rather than sugary, plantains must be cooked before being eaten; for example, they can be fried or boiled. A bunch of plantains matures from 8 to 18 months after growth begins.

Each pseudotrunk that sprouts bears only one bunch of fruit. However, new rhizomes are formed at the same spot and as many as three plantain "trees" may be in various stages of growth at the same time. The life of a clump of rhizomes is 5 to 10 years.

Bananas

Of the same family as plantains, bananas belong to a different species. They are also smaller, finer, and thinner skinned and grow more closely together in hands. Bananas are sweet rather than starchy and are usually eaten raw. Few are exported; instead they are grown mostly for family use and domestic trade.

Corn

Corn (Zea mays) is the third largest grain crop but is not the dominant food crop in any large area of Nigeria. It is usually grown in areas which produce root crops in larger quantity than corn.

Since corn requires more rain than sorghum or millet, it is mostly grown in the southern States. However, more corn is being cultivated farther north toward the drier edges of the areas suitable for its production. The largest amounts of corn grow in Western, Kwara, and Benue Plateau States. Significant quantities are also produced in Mid-Western, North Central, and North Eastern States.

In the north, corn is planted in May and June and harvested in August. In the south, the early corn crop is planted in March and April and harvested from June to August. A late crop may be planted in early September and harvested in December and January.

In Nigeria, corn is used mostly for human food. Fresh, unripe corn, roasted or boiled, is eaten on the cob. Ripe, dry grains may be cooked with peas and beans and oil and condiments, and eaten as "adalu" or ground into flour or meal. Corn is a fairly well balanced food but somewhat low in vitamin D, riboflavin, and niacin.

In southern Nigeria, corn is also popular as feed for livestock, including

poultry. In northern Nigeria, grain sorghum and millet are usually used for the limited livestock feeding that is done.

Cowpeas

Cowpeas represent the cheapest, most important, and most widely used source of plant protein in Nigeria (fig. 10). They are also a good source of carbohydrates, calcium, iron, B vitamins, and carotene.

FAO data indicate that Nigeria is, by far, the world's largest producer of cowpeas. They are grown mostly in the drier, sunnier parts of the country especially the northern States. Large internal shipments are made to the south.

Since the cowpea is quite sensitive to differences of only a few minutes in a day, locally adapted varieties must be planted. July and August are the best months for planting in the north; September is best in the south.

Hand harvesting and threshing usually take place in November and December in the north and December and January in the south. Some green pods are picked from the vines. Others are not harvested until they have dried on the plants.

Cowpeas are cooked and served in a variety of ways, alone or with other vegetables, or with meat, fish, or eggs.

Yields could be much larger if it were not for insect depredations, particularly by the caterpillar Maruca testulalis, which damages flowers and pods; the beetle Piezotracheus varium, which attacks seeds; and four types of coreid bugs, which destroy the pods. Damage is also inflicted by cowpea yellow mosaic virus and cowpea mottle virus and by nematodes.

Production will probably continue at a rather constant level, perhaps rising somewhat, in response to population increases.

Rice

Nigeria can be considered self-sufficient in rice production. However, per capita consumption (13 pounds a year) is low, compared with that in countries west



Figure 10.--Searching for a better variety of cowpea, Nigeria's major source of vegetable protein. The country is the world's largest producer of cowpeas. (Photo by A.J. Bennett, Research Station, Samaru, Zaria.)

of the Bandama River in the Ivory Coast, the traditional line of demarcation between people consuming considerable amounts of rice and people eating small amounts. In Sierra Leone and Liberia, for example, per capita rice consumption is over 250 pounds a year, paddy (unhusked) basis.

Rice, both wet and dry types, is grown mainly in the northern States of Nigeria on fadamas (low, swampy areas) and riverbanks that are flooded during the rainy season. A relatively small rice area is also grown under controlled irrigation in these States. Wet rice is cultivated in naturally flooded inland swamps in the southeastern States and in some of the tidal mangrove swamps on either side of the Niger River. Most rice produced in Mid-Western State consists of rainfed or upland types. Little if any land is devoted to rice in Western and Lagos States.

Two species are grown, the indigenous west African species, Oryza glaberimma; and the common, white-grained species, Oryza sativa, which was introduced into Nigeria about the time of World War I. The indigenous red-grained rice has low yields and is more difficult to sell than white rice, but it is flood-resistant and thus continues to account for about two-fifths of Nigeria's rice crop.

Wet rice is planted in seedbeds in May and June, transplanted in July and August, and harvested from October to January. Upland rice is planted earlier, in April and May; and it is ready for harvest in August and September.

At present levels of consumption, Nigeria will continue to be self-sufficient in rice. With some promotion, several thousand additional tons of rice could be produced, either for additional domestic consumption or for export to nearby countries in western Africa.

Kolanuts

For centuries, the kolanut (Cola acuminata) has occupied a unique place in the ceremonial and cultural life of West Africa. It has long been a traditional item of consumption among the Yorubas of southwestern Nigeria, as well as a special trade commod-

ity between the southwest, where production is concentrated and the north, a major consuming area.

Nigeria is the world's largest producer of kolanuts; the Ivory Coast is the largest exporter. Nigeria is the largest exporter to the United States; kolanuts are used in making cola soft drinks and, to a limited extent, in pharmaceutical preparations.

Kolanuts are of the same family as cocoa beans and generally thrive under similar conditions. In fact, kolanuts and cocoa are often grown together. The kola tree thrives in areas with a mean temperature of between 70° and 80° F., an annual rainfall of 100 inches or more, and deep, well-drained soils. However, one source states: "The (kola) tree possesses the ability to flourish on the light soils of sedimentary origin, which are unsuited to cocoa...".

The kolanuts are usually planted, although the tree can be propagated asexually by rooting the cuttings. The trees begin to bear at 5 or 6 years of age but do not reach full maturity until they are at least 12 years old and will continue to bear for 50 years or more. The Gbanga type is grown for shipment to the north. The Abata type is grown on a small scale for local consumption in the southwest.

Kolanuts are harvested from October to December, with a minor harvest in June and July. Each pod, which contains six to 12 nuts, is shaken or cut from the trees.

The nuts are sold fresh or cured and dried. Curing and drying is a long process involving washing, soaking, fermenting, storing in special containers, and checking for possible weevil damage.

Trade is highly organized in the hands of a few large wholesale traders living in producing areas in the southwest, with branches in the north. Kolanuts are firmly established in traditional consumption patterns. Production seems likely to at least rise with population. Exports to the United States for use in cola soft drinks will probably increase. However, the relatively small quantities of kolanuts shipped to the

United States by Nigeria and other producers hardly seem adequate to flavor the great quantities of cola drinks sold every year by the big U.S. soft-drink bottlers.

Sugarcane

Nigeria's three main agricultural imports are dairy products, wheat, and sugar. Of these, sugar is the one most likely to be replaced by local production. In fact, much has already been accomplished in this direction, as will be discussed later.

Sugarcane belongs to the grass family, with a much enlarged, jointed stalk and sap that is distinctly sweet. The crop is widely cultivated throughout the tropics and subtropics in altitudes up to 4,000 feet. It will grow in most soils and thrives in light, alluvial types. Sugarcane needs about 50 inches of rainfall a year, rather evenly distributed during the growing season. The crop also does well under irrigation.

Though sugarcane produces flowers under favorable conditions, commercial plantings are always made with pieces of stalk from the previous year's crop. Thus, a considerable portion must be used for planting. Under favorable conditions, two or more crops may be grown from one planting; all except the first are called "ratoon" crops. When growth is complete--in 12 to 18 months--the blades (long leaves) are stripped off and the stalk is cut down. The sweet juice is pressed out at a cane mill and used to make syrup, molasses, and sugar. For many years, Nigerian farmers have also produced unrefined brown sugar by boiling down cane juice in crude equipment, such as halves of steel drums.

Commercial sugar production in Nigeria began in 1964/65, when the Nigerian Sugar Company manufactured 4,952 tons of refined sugar in its modern refinery at Bacita, from sugarcane grown on its nearby plantation. Bacita is in Kwara State, about 75 miles north of Ilorin. Production has increased year by year, so that during the 1968/69 season, the company produced 23,118 tons of refined sugar from 253,137 tons of sugarcane, a turnout of 9.1 percent. The company's 1970 sugar crop amounted to 27,005 tons.

Sugar is sold to bulk buyers at Bacita or made into cubes at the company's cubing plant at Ilorin. The company, owned partly by the Government of Nigeria and partly by private companies, is located on an 8,500-acre tract and employs a large labor force. So far, it is the only commercial sugar enterprise operating in Nigeria. If the country is to become self-sufficient in sugar, additional plantations and refineries will be needed.

Tobacco

Nigerian growers produce, in total, the largest tobacco crop in west Africa and the fifth largest in all of Africa (after Rhodesia, the Republic of South Africa, Algeria, and Malawi).

Most Nigerian tobacco is used domestically. Although small amounts are exported, larger amounts of different kinds of tobacco are imported, making Nigeria a net importer.

Approximately half the tobacco is grown in small patches for home use. The other half, also grown in small patches, is sold to local tobacco factories, which sell their finished products in Nigeria. The largest concentrations of tobacco are found in Western State in the south and North Western, North Central, and Kano States in the north.

In the south, tobacco seeds are sown in nursery beds in mid-July and the seedlings are transplanted to the fields in September (fig. 11). In the north, seedbeds are sown in May and June and transplants made in July and August. Once transplanted, the plants grow rapidly in both areas and are ready for harvest in 2 or 3 months.

As they mature, the leaves are picked off and strung on twine or tied in small bundles and hung on sticks to cure. In the south, the leaves are often cured in the air in thatch-roofed sheds. Since the air is so moisture-laden, drying takes a long time. Much tobacco is now flue-cured in barns where, to expedite the curing process, artificial heat from wood or other fuels is passed through pipes ("flues") constructed inside the barns. The leaves turn from

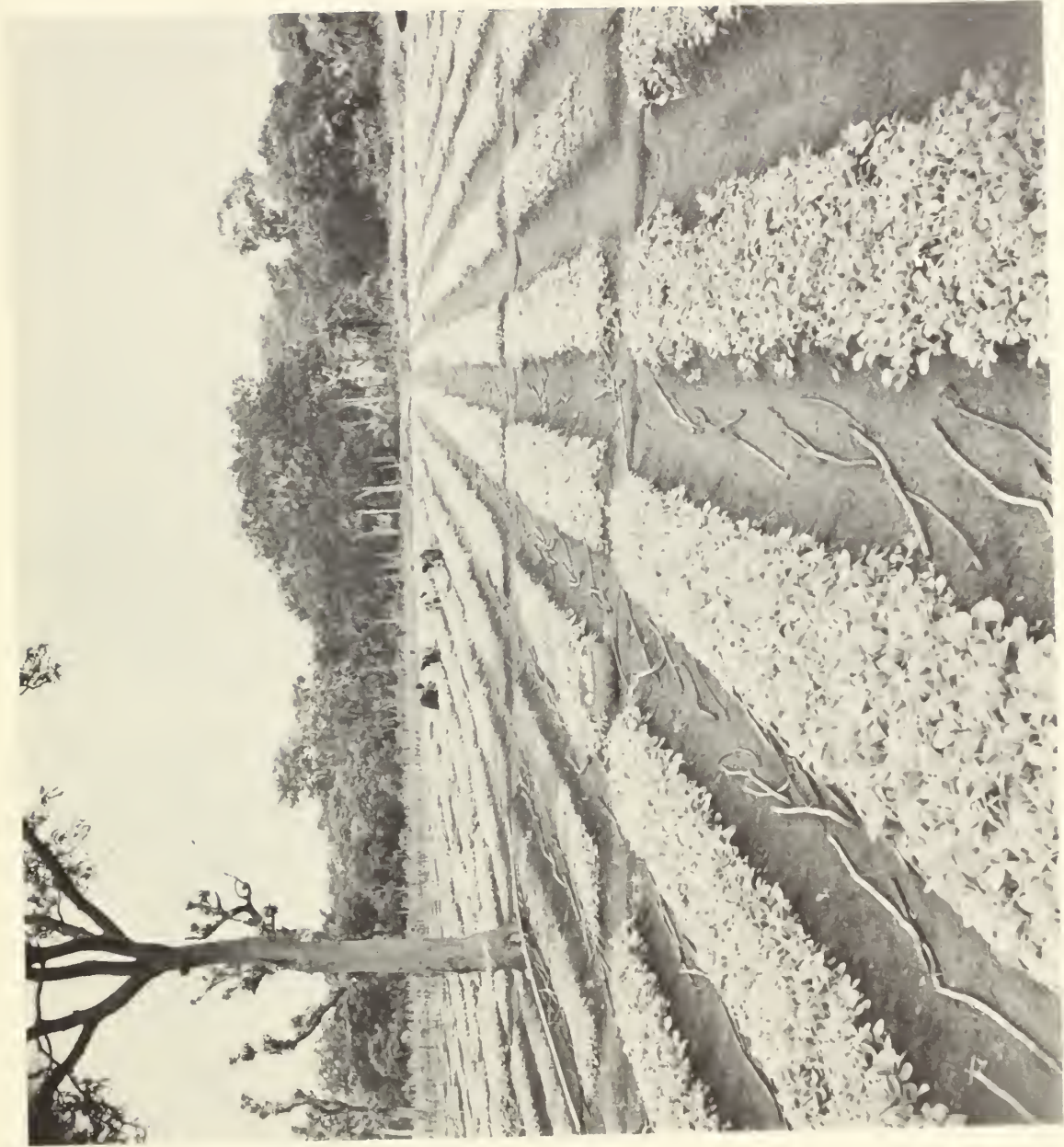


Figure 11.--Tobacco seedlings before transplanting to open fields. Nigerian farmers grow the largest tobacco crop in west Africa and supply most of the country's domestic requirements. (Photo from Nigerian Tobacco Company.)

green to yellow and finally to dark brown. In the north, the dry air brings a quick cure and a yellow color.

Nigeria's four cigarette factories are located at Ibadan, Zaria, Port Harcourt, and Ilorin. The first three mentioned are owned by the Nigerian Tobacco Corporation, a subsidiary of a long-established English tobacco company. Over the years, the corporation has closely supervised the growing and curing of tobacco. The Port Harcourt cigarette factory was closed during the civil conflict. The cigarette factory at Ilorin is owned and operated by an affiliate of an American company. Most cigarettes smoked by Nigerians are made in these four factories.

For years, Black Fat, a special type of tobacco, has been imported from the United States. Nigeria has been a large user of this specially processed tobacco.

Nigeria will apparently continue to be substantially self-sufficient in tobacco and could become a significant exporter.

Wheat

Nigeria does not have a favorable climate for wheat, but the Government is encouraging production to replace imports. Three States in the far north continue to promote wheat as a crop which can be grown under irrigation during the dry season when farmers are not busy with other crops.

Several years ago, the Government plan had a production target of about 24,000 tons of wheat annually during 1968-72. The Gomburu (North Eastern State) Wheat Pilot Scheme was to have been extended to 35,000 acres by 1968/69, but this goal was not reached. In a recent statement, the military governor of North Eastern State said that a 4-year development program there would include a 46,000-acre wheat project. There are other projects in Kano State and North Western State. Production in 1970/71 is estimated at 5,800 tons from 8,000 acres.

Other Crops

A number of other crops are now important as exports or show promise for the future.

Shea nuts.--Shea nut trees grow wild throughout the northern States. The fruits are picked up from the ground. The sweet mesocarp is eaten; the kernels are dried for export or processed for oil or shea butter. In 1969, shea nut exports were valued at \$3.4 million, going chiefly to the United Kingdom, Denmark, and Japan.

Coffee.--Work by the Cocoa Research Institute of Nigeria has proved that Arabica coffee will flourish in the Mambilla Plateau (elevation 6,500 feet), in North Eastern State near Yola. Robusta coffee is grown to a small extent in Western State and adjoining northern States. Coffee exports in 1969 were valued at \$2.8 million, going mostly to the United States and the United Kingdom. Apparently, coffee production can be greatly increased in Nigeria.

Gum arabic.--In the northern States, gum arabic is collected from wild plants of the mimosa family. The sap exudes through breaks in the bark and hardens into transparent light-yellow lumps, or "tears." These lumps are collected, bleached in the sun, cleaned, and exported. Known since ancient times, gum arabic is widely used in food products, medicines, adhesives, leather polishes, water paints, inks, and ceramics. Exports from Nigeria were valued at \$1.9 million in 1969 and went chiefly to France, West Germany, the United Kingdom, and the Netherlands.

Ginger.--Ginger is a specialty crop, grown in North Central State near Zaria and in Benue Plateau State. Rhizomes are used to plant the crop, which is an annual. They also represent the article of commerce and serve to flavor gingerbread, ginger-cakes, ginger ale, and ginger beer. Digging, cleaning, and washing rhizomes are laborious tasks. Ginger exports in 1969 were valued at \$1.3 million and went chiefly to the United States and the United Kingdom.

Coconuts.--The main areas of coconut production are near Lagos in Lagos and Western States, in the delta of the Niger River, and eastward in the heavy rainfall area along the Gulf of Guinea in Rivers and South Eastern States. Exports of copra (dried coconut meat) were valued at \$390,000 in 1969; Denmark is Nigeria's best customer.

Apparently, fairly large areas in Nigeria are suited for growing coconuts. It is not known whether oil palms would be more profitable, however.

Miscellaneous crops.--Among other crops for export or domestic use are cashew nuts (a tree crop), melonseed (for oil), bambarra groundnuts (voandzu), pigeonpeas, pineapples, citrus fruits, mangoes, avocados, papayas, onions, peppers, okra, and fluted pumpkins.

Since Nigeria has no cold, dormant season, deciduous fruits cannot be grown. Nor is the climate generally suited to such vegetables as white potatoes and celery. However, some white potatoes are grown near Zaria and in the highlands around Jos.

Livestock and Livestock Products

The inventory of livestock in Nigeria in 1967/68 was estimated by FAO as follows:

	<u>1,000</u>
Cattle.....	11,410
Sheep.....	7,800
Goats.....	23,200
Hogs.....	780
Horses.....	345
Donkeys.....	880
Camels.....	8
Poultry.....	56,000

Cattle

Most of Nigeria's numerous cattle are found in the northern States, particularly north of the Niger and Benue Rivers (fig. 12). Cattle in the southern areas of the country are beset by the tsetse fly.

In the northern States, cattle are mainly short-horned Zebus, which, as a rule, are highly susceptible to trypanosomiasis (carried by the tsetse fly). Of the recognized Zebu types, the White Fulani is the most numerous. It is a large, good draft animal but is usually reared and sold for beef. White Fulani cows give only small amounts of milk but produce more than other northern Zebu types, such as the Red Fulani; the Gudali; the Wadara, or Shua Arabi; the Banyo; and the Ngaundere. There also are a number of humpless Sanga types and crosses with the short-horned Zebu.

The bulbous-horned Kuri of the Lake Chad area is another well-known local type.

In the southern States, the Muturu, or humpless dwarf shorthorn, and the somewhat larger N'Dama, or West African Longhorn, predominate. Both types are only partially resistant to trypanosomiasis infection. They are suited for meat but not milk production.

The predominant cattle-raising system in Nigeria is that practiced by the semi-nomadic Fulani people who are of Hamitic origin. The Fulanis live all across the savanna zone of Africa, from Senegal to Sudan, not just in Nigeria. The less numerous Shuwa herdsmen follow livestock husbandry practices similar to those of the Fulani.

The Fulani have long practiced nomadic husbandry, moving seasonally with their herds in search of water and forage. At harvesttime, they have agreements with settled farmers to graze the millet and grain sorghum stalks in return for manure left by the herds. Sometimes, farmers make additional payments for the manure, usually in the form of harvested grain. The Fulani sell milk, butter, and cheese produced by their cattle.

Some cattle, usually culls, are slaughtered in the north and the meat is flayed, boiled, and dried over a smoky fire. This dried beef is shipped south for sale. Some corned beef is canned in Nigeria.

Other cattle are shipped live by rail or truck to the south. A larger number of cattle are walked south to market. Some are sold for slaughter along the way and some reach Ibadan and Lagos slaughterhouses or slaughter slabs.

Usually, after the cattle are slaughtered, the bones are removed and the meat cut in cubes; the meat is not separated into steaks, roasts, and so on. It is used to flavor stews of root or grain crops, thus, emphasis is on flavor, not tenderness.

Just before the civil conflict, the Nigerian Meat Company was slaughtering cattle in Nguru in North Eastern State and shipping chilled carcasses to Lagos. A meat price of 14 cents a pound in Nguru



Figure 12.--Cattle at a watering place in northern Nigeria. They are being driven south for sale. (Photo from Food and Agriculture Organization of the United Nations.)

and 35 to 42 cents in Lagos gave a theoretically profitable price differential. Disturbed conditions incident to the civil war caused this business to be discontinued. The picture of cattle trade in Nigeria is blurred by unrecorded movements across the border from nearby French-speaking countries; such movements are estimated to total 100,000 cattle a year.

Sheep

To the unpracticed eye, the hair sheep of Nigeria look like goats. Such animals with tails held up are goats, those with tails down are sheep. Long-legged hair sheep graze in the northern States. Often, they are kept by the Fulani people along with their cattle herds and are driven south with cattle to be sold. Two of the breeds are the Ouda and Y'ankasa. Sheep are sometimes killed for meat and skins. In the southern States, dwarf sheep are prevalent around the villages but are rarely kept in large herds.

Goats

Goats are the most numerous livestock, not counting poultry, in Nigeria. They are found around every village. Like Nigerian sheep, the goats are dwarfs in the south and long-legged in the north.

Goats are slaughtered for meat and skins. Skins from red Sokoto goats in the north are tanned into Morocco leather. Brown Kano goats are said to have skins only slightly inferior to the red Sokoto. In North Eastern State, another type of goat is larger and thought to be inferior in quality; its skin is used for suede leather. The stocky southern goats turn out a higher percentage of meat, when butchered, than the northern goats.

Hogs

Most hogs in Nigeria belong to the long-nosed razor-backed, local black breed, which scavenges for a living. Exotic breeds from Britain--chiefly Large White, Large Black, Berkshire, and Tamworth--are kept by commercial hog raisers.

Hogs are rather rare in Nigeria, possibly because the continually hot climate makes it difficult to cure hams, shoulders,

and bacon by salting and smoking, the traditional method in Western Europe and North America. Also, Moslem Nigerians, most of whom live in the north, do not eat pork because the Koran forbids it. However, a commercial hog-raising operation at Kano claims to be one of the largest in the world. The hogs are reared to between 200 and 250 pounds before being shipped by rail to the coast. As the demand for pork increases, Nigerian hog farmers can probably supply the need.

Horses, Donkeys, and Camels

Although horses are not numerous in Nigeria, they have long been bred for war, riding, and sport in the north among the Fulani and Hausa chiefs and warriors. Apparently few, if any, horses are used as work stock. There are no significant numbers of mules. Donkeys are much more numerous in Nigeria than horses and are more useful to farmers. They are widely used in the north as pack animals to carry seed cotton and other marketable products to buying stations. The estimated 8,000 camels in Nigeria are used as pack animals and as a minor source of meat. They are found in the northern States bordering on Niger.

Poultry

Most Nigerians keep a few chickens of local types around their huts. They are small, turn out little meat when killed, and each hen lays only a few small eggs. The chickens are given free range to scavenge for food around the villages. Some ducks, geese, guinea fowls, and turkeys are similarly raised.

A small but growing number of Nigerian chicken farmers keep imported breeds in houses and give them careful feeding and management. The most common breeds raised include Rhode Island Red, White Leghorn, and New Hampshire. These egg and broiler farms have been expanding since the early 1960's. A serious threat to continued expansion is Newcastle disease, which is widespread in Nigeria and is believed always present among chickens in villages. It sometimes wipes out whole flocks before news of its appearance can reach Government veterinarians.

Table 6.--Quantity and value of principal agricultural exports, Nigeria, average 1963-65, annual 1968 and 1969

	Quantity			Value			Share of agricultural exports, 1969
	1963-65 average	1968	1969	1963-65 average	1968	1969	
	1,000 tons			1,000 dollars			Percent
Cocoa and products:							
Cocoa beans.....	229.2	208.9	173.6	107,473	144,874	147,269	40.0
Cocoa cake, powder, and butter:	0	21.2	21.6	0	17,024	23,439	
Peanuts and products:							
Peanuts.....	565.8	648.3	525.3	101,412	106,268	100,271	34.0
Peanut oil.....	81.3	110.9	101.0	23,048	26,471	30,512	
Peanut cake and meal.....	114.3	168.4	170.6	11,779	13,315	14,018	
Oil palm produce:							
Palm kernels.....	409.1	161.6	185.8	63,771	28,484	27,316	10.0
Palm kernel oil.....	1.7	27.3	37.3	372	9,313	10,887	
Palm kernel cake and meal.....	1.8	30.9	40.2	190	2,352	3,325	
Palm oil (edible).....	131.6	.8	5.0	21,831	110	818	
Palm oil (inedible).....	7.2	2.6	3.1	1,282	288	395	
Rubber, raw.....	68.5	52.8	59.2	32,450	17,650	25,908	6.1
Cotton:							
Cotton lint.....	37.0	14.3	14.3	14,560	9,149	9,397	2.9
Cottonseed.....	67.1	29.0	44.2	4,286	2,476	2,814	
Hides and skins:							
Goat and kid.....	2.6	2.3	2.4	4,890	5,091	5,463	2.6
Cattle and calf.....	4.4	3.8	3.7	2,948	2,535	2,709	
Sheep and lamb.....	.9	1.1	1.1	1,469	1,881	2,023	
Reptile.....	.2	.1	.1	2,458	1,316	962	
Benniseed (sesame).....	18.2	14.3	17.1	3,744	3,269	3,840	0.9
Shea nuts.....	18.9	18.7	22.9	1,460	2,350	3,424	.8
Coffee.....	2.3	2.4	4.8	1,146	1,401	2,770	.6
Gum arabic.....	1.8	3.9	4.2	546	1,661	1,878	.4
Prepared animal feed.....	n.a.	n.a.	n.a.	4,281	1,349	1,587	.4
Ginger.....	2.4	2.0	3.2	925	598	1,295	.3
Soybeans.....	17.0	14.2	6.9	1,737	1,337	564	.1
Copra.....	3.6	4.0	2.2	620	804	390	.1
Other agricultural exports.....	--	--	--	3,318	4,003	2,979	.7
Total agricultural exports.....	--	--	--	411,996	405,369	426,253	100.0
Total agricultural exports to United States.....	--	--	--	31,903	31,578	26,652	--
Total nonagricultural exports.....	--	--	--	202,486	172,844	468,880	--
Total exports.....	--	--	--	614,482	578,213	895,133	--
					Percent		
Agricultural exports as per- centage of total exports.....	--	--	--	67.0	70.1	47.6	

Note: n.a. means not available.

Source: Nigeria Trade Summary, Dec. issues for 1963, 1964, 1965, 1968, and 1969.

Daily per capita food consumption (1959-61 average) was estimated at 2,450 calories, of which 1,147 were derived from starchy root crops (cassava, yams, cocoyams, and so on), 768 calories from grains (sorghum, millet, corn, rice, and wheat flour), and 232 calories from vegetable oils (mostly palm oil). Only 27 calories were obtained from meat and 7 calories from fish. This food balance was constructed in the Economic Research Service (ERS), U.S. Department of Agriculture (USDA). Another food balance for Nigeria, prepared by FAO for the provisional indicative world plan, indicated an average food consumption in 1962 of 2,182 calories.

Though the average Nigerian diet is adequate in calories, it is deficient in proteins. Nigeria is largely self-sufficient for food; only 1.5 percent of the daily calories are from imported foods. The chief food imports are sugar, wheat for milling, fish, and milk and cream.

Nigerian farm exports are notable for their variety and amount. The converse is true of Nigerian farm imports, considering the large population of the country. Also impressive is the relatively short list of farm products imported (tables 6-9).

In 1969, Nigeria's best customers for farm products were, in order of value: The United Kingdom, the Netherlands, France, West Germany, Italy, the United States, the USSR, Portugal, Belgium and Luxembourg, Switzerland, Spain, Japan, Sweden, Denmark, Poland, Austria, Canada, and Hong Kong.

In 1969, Nigeria's chief suppliers of farm products were, in order of value: The United States, the United Kingdom, the Netherlands, France, Denmark, Czechoslovakia, the USSR, Iceland, the Ivory Coast, Belgium and Luxembourg, Pakistan, Finland, Italy, Ghana, West Germany, Yugoslavia, Poland, Switzerland, Congo (Kinshasa), and Norway.

Table 7.--Quantity and value of principal agricultural imports, Nigeria, average 1963-65, annual 1968 and 1969

Commodity	Quantity			Value			Share of agricultural imports, 1969
	1963-65 average	1968	1969	1963-65 average	1968	1969	
	1,000 tons			1,000 dollars			Percent
Wheat.....	46.2	105.7	175.4	8,499	9,763	16,480	25.8
Milk and cream.....	19.2	22.8	37.3	8,397	10,363	11,552	18.1
Sugar.....	63.2	32.4	67.0	5,943	4,211	10,146	15.9
Cereal preparations.....	12.5	13.2	24.1	3,982	2,993	4,758	7.5
Fruits and vegetables.....	14.6	10.4	7.6	4,802	2,549	3,171	5.0
Essential oils.....	.3	.4	.5	907	1,348	1,650	2.6
Starches.....	n.a.	n.a.	n.a.	469	1,029	1,437	2.2
Coffee.....	.5	.5	.8	387	698	1,183	1.9
Jute.....	--	6.8	3.2	3	2,011	1,133	1.8
Sugars and syrups.....	.9	3.7	4.0	271	642	867	1.4
Tobacco, unmanufactured.....	2.0	.4	.2	3,364	1,000	543	.8
Other agricultural imports.....	--	--	--	12,310	6,906	10,940	17.1
Total agricultural imports ^{1/}	--	--	--	49,334	43,513	63,860	100.0
Total agricultural imports from United States.....	--	--	--	10,738	14,512	23,816	--
Total nonagricultural imports.....	--	--	--	638,071	497,405	632,475	--
Total imports.....	--	--	--	687,405	540,918	696,335	--
Agricultural imports as percentage of total imports:	--	--	--	7.2	8.0	9.2	--

Note: n.a. means not available. ^{1/} No allowance made for imports of live animals by land.
Source: Nigeria Trade Summary, Dec. issues for 1963, 1964, 1965, 1968, and 1969.

Table 8.--Principal countries of destination for leading farm exports, ranked by value, Nigeria, 1963-65 average and annual 1969

Exports	: 1963-65 : : average :	1969
	: <u>Percent</u>	<u>Percent</u>
Cocoa and products:		
United Kingdom.....	23	25
Netherlands.....	22	21
West Germany.....	14	14
USSR.....	3	13
United States.....	22	9
Italy.....	5	9
Peanuts and products:		
France.....	21	32
United Kingdom.....	29	30
Oil palm products:		
Netherlands.....	26	33
United Kingdom.....	30	32
West Germany.....	11	16
Rubber:		
United Kingdom.....	33	39
United States.....	33	32
West Germany.....	15	14
Sweden.....	5	13
Cotton (lint and seed):		
Italy.....	2	21
Belgium-Luxembourg....	13	18
Japan.....	5	17
Netherlands.....	15	11
Hong Kong.....	2	10
United Kingdom.....	26	8
Hides and skins:		
Italy.....	12	33
United States.....	29	18
Spain.....	3	16
United Kingdom.....	19	11

Source: Nigeria Trade Summary, Dec. issues for 1963, 1964, 1965, and 1969.

AGRICULTURAL TRADE WITH THE UNITED STATES

Agricultural imports by the United States from Nigeria in 1969 and 1970, as reported by the Bureau of the Census, U.S. Department of Commerce, are shown in table 10.

According to Nigerian trade figures, in 1969, Nigeria sent the United States 9 percent of its exports by value of cocoa and products, 32 percent of rubber exports, 18 percent of exports of hides and skins, 40 percent of coffee exports, and 34 percent of ginger exports.

Agricultural exports by the United States to Nigeria in 1969 and 1970 as reported by the Census, are shown in table 11.

According to Nigerian trade figures, in 1969, the United States supplied Nigeria with 99 percent by value of wheat imports, 4 percent of milk and cream imports, 18 percent of imports of cereal preparations, and 26 percent of fruit and vegetable imports. Altogether, 37 percent of Nigeria's farm imports came from the United States that year.

Table 9.--Principal countries of origin for leading farm imports by Nigeria, 1963-65 average and annual 1969

Imports	: 1963-65 : : average :	1969
	: <u>Percent</u>	<u>Percent</u>
Wheat:		
United States.....	88	99
Milk and cream:		
Netherlands.....	72	67
Denmark.....	13	21
Sugar:		
France.....	22	25
United Kingdom.....	54	22
USSR.....	0	16
Czechoslovakia.....	24	16
Cereal preparations:		
United Kingdom.....	51	39
United States.....	1/	18
Fruits and vegetables:		
United States.....	4	26
United Kingdom.....	16	20
Ghana.....	6	18
Italy.....	32	5
Essential oils:		
United Kingdom.....	71	80

1/ Less than 1/2 of 1 percent.

Source: Nigeria Trade Summary, Dec. issues for 1963, 1964, 1965, and 1969.

Table 10.--Agricultural imports by the United States from Nigeria, 1969-70

Commodity	Quantity		Value	
	1969	1970	1969	1970
	1,000 tons		1,000 dollars	
Cocoa and products.....	22.4	25.2	12,115	17,664
Rubber.....	16.0	16.0	7,438	7,809
Hides and skins.....	1.3	.7	2,830	1,770
Spices (ginger).....	1.3	1.4	656	1,252
Coffee.....	1.8	.8	1,138	645
Palm kernel oil.....	.5	0	138	0
Other farm products.....	--	--	194	212
Total.....	--	--	24,509	29,352

Source: Economic Research Service, U.S. Foreign Agricultural Trade Statistical Report, Calendar Year 1970, U.S. Department of Agriculture, June 1971.

Table 11.--Agricultural exports from the United States to Nigeria, 1969-70

Commodity	Quantity		Value	
	1969	1970	1969	1970
	1,000 tons		1,000 dollars	
Wheat and flour.....	182.1	268.3	11,711	15,877
Milk and cream, dried.....	.7	7.8	407	4,453
Cereal preparations.....	22.7	34.0	3,153	4,441
Miscellaneous food preparations.....	--	--	1,127	1,165
Food for relief.....	--	--	395	1,076
Tobacco, unmanufactured.....	.2	.4	401	957
Animal fats.....	1.2	2.4	203	472
Butter.....	0	.5	0	299
Hops.....	<u>1/</u>	.2	47	298
Dried beans and peas.....	1.3	<u>1/</u>	267	4
Rice, milled.....	4.5	0	794	0
Other farm products.....	--	--	406	520
Total.....	--	--	18,911	29,562

1/ Less than 50 tons.

Source: Economic Research Service, U.S. Foreign Agricultural Trade Statistical Report, Calendar Year 1970, U.S. Department of Agriculture, June 1971.

Agricultural Development

Agricultural planning and development in Nigeria have been set forth in considerable detail in at least four publications or sets of publications:

1.--National Development Plan, 1962-68. There are four plans, one each for the former Western, Eastern, and Northern regions, and one for Federal Nigeria.

2.--Agricultural Development in Nigeria, 1965-1980. This plan, prepared by FAO at the request of the Government of Nigeria, gives rather thorough accounts of the early results of the 1962-68 development plan.

3.--Strategies and Recommendations for Nigerian Rural Development, 1969/1985. This plan was prepared by the Consortium for the Study of Nigerian Rural Development (CSNRD) for AID and transmitted to the Nigerian Ministry of Economic Development. Members of the Consortium are Michigan State University, the University of Wisconsin, Kansas State University, Colorado State University, U.S. Department of the Interior, USDA, AID, and Research Triangle Institute.

4. Second National Development Plan 1970-74. This plan was announced in November 1970. Top priority is given to agriculture, industry, and transportation.

Agricultural Controls

Marketing boards mentioned briefly earlier are important in Nigerian agriculture and of great interest to agricultural economists. These boards were first set up on a commodity basis, then reorganized so that each of the four former regions had one marketing board. Now that Nigeria has 12 States, the situation is changed somewhat. Each of the six States in the southern half of the country now has its own marketing board; the Northern States Marketing Board (NSMB), which is situated in

Kaduna, serves the six States in the northern half.

For selected crops, the marketing boards make purchases, on a monopoly basis, at uniform prices fixed in advance of the marketing season. Crops handled vary from board to board but the following primary farm products are handled by one or more boards: Peanuts (excluding peanut oil and cake), cocoa, palm kernels, palm oil, cottonseed, soybeans, sesameseed, castorseed, coffee, ginger, cotton lint, and copra. Formerly, the prices paid reflected transportation costs and thus varied according to the place where the commodity was produced. However, in recent years, some boards have begun to absorb cost of transportation from place of production to the port, thus giving a uniform price to all producers of the commodity in the State. The Western State Marketing Board pays such uniform prices for cocoa beans, palm kernels, and palm oil.

The intention of the marketing boards in fixing producer prices is to reduce price inequalities from one locality to another and to help cushion the producer against fluctuating world market prices. In addition, the marketing boards constitute an important source of Government revenue. Part of their earnings have been channeled into aid for educational and research programs and reportedly into support of Nigeria's 6-year development plan (1962-68). The Nigerian farmer receives his chief production incentive in the form of an assured market at a season-fixed price offered by the marketing boards.

Many other Nigerian farmers grow and sell crops and livestock destined for consumption within Nigeria; these market transactions are not handled or supervised by the marketing boards.

Nigeria has no acreage or production controls. Nor does the Government pay export subsidies, as such, on farm products. Instead, it levies duties and taxes on a large number of export commodities to raise revenue.

The Government uses customs duties (tariffs) mostly to raise revenue. Import restrictions are used to protect foreign

exchange reserves and local industry through import substitution. The device usually used to implement import restrictions is the "specific import license." As of mid-1970, about 42 percent of all imports required such licenses.

International Trade Policy

In 1966, Nigeria signed the Lagos Convention, which was to lead to associate membership in the European Economic Community. Such associate membership was expected to bring tariff advantages for Nigeria in Western Europe, but no economic assistance. However, the Lagos Convention was never ratified by the parliaments of the member States and thus did not come into force. However, as of late 1971, the possibility of Nigerian associate membership in the Community was again being considered.

GENERAL ECONOMIC SITUATION

Nigeria continues to be a pioneer land with an economy based on the production of raw materials, chiefly agricultural commodities and petroleum. However, the country is fortunate in having diversified resources and the capability of producing a number of farm crops in active demand in the world market--cocoa, peanuts, palm kernels and palm oil, rubber, and cotton. However, farm products which formerly made up 50 to 75 percent of exports are now down to less than 40 percent. This decrease in agriculture's share of total exports is largely due to the great increase in value of petroleum exports. Internal farm commodity trade is active and extensive, with a large population providing an assured market.

Granting certain limitations, Nigeria has a prosperous and active economy. With the civil war now in the past, economic factors point to sustained expansion and growth. However, there are several problems. Not enough people have managerial and technical skills; distances are great and transportation inadequate; even with greatly increased supplies from the Kainji Dam, electricity remains inadequate; land clearing is costly; and most farming is primitive and inefficient.

Nigeria's Gross National Product (GNP) was estimated at \$4.83 billion in 1969, a rise of 17 percent in 2 years. Per capita GNP was \$88 in 1969.

Industrial Development

Industry is achieving increasing importance in Nigeria. Starting from a very low base, percentage increases in industrial development over the next few years may be really spectacular.

A partial listing of Nigerian farm products now being processed includes cocoa beans, peanuts, palm fruit, palm kernels, cotton, tobacco, and sugarcane.

Seven breweries making beer and stout have displaced a significant part of imports of these products.

A flour mill at Apapa (Lagos) supplies practically all Nigeria's present consumption of wheat flour. Nigeria's per capita consumption of wheat flour is relatively small. A mill at Port Harcourt was nearly complete when the civil war broke out and has not yet been completed.

Several plants produce cement from Nigerian limestone or from imported clinkers.

Other Nigerian factories produce a wide range of products, including bakery goods, canned fruits and juices, clothing, shoes, towels, blankets, cosmetics, perfumes, pharmaceuticals, furniture, bicycles, radios, batteries, enamelware, paint, and tires and tubes.

Mining

Aside from petroleum extraction, mining is not important in the economy. Tin is mined and refined on the Jos Upland; it was especially important during World War II, when tin supplies to the Allies from Malaya were cut off by a Japanese blockade.

Coal is mined at Enugu and is useful in running trains and generating electricity.

Nigeria was for a long time the world's chief supplier of columbite and remains an important producer. Found in association with tin ore, columbite is used to make jet airplane engines and stainless steel.

Petroleum development

Development of its petroleum resources has been one of Nigeria's most significant economic achievements in recent years. Exploration for petroleum began in 1937. The first big discovery was in the Niger delta. Quantities significant for commerce were not found until 1956. Two years later, crude petroleum began to be exported.

Production of crude petroleum had reached almost 600,000 barrels a day when the Nigerian civil conflict began in July 1967. During its early months, the civil war greatly reduced production of crude oil and gas. Recovery of the petroleum industry was well advanced when the war ended in January 1970. The end of hostilities brought a boom in the search for petroleum and its extraction. By early 1971, production had reached 1.5 million barrels a day, making Nigeria one of the 10 largest petroleum producers in the world.

A British-Dutch company has been the largest petroleum producer in Nigeria. Three American companies together have a half-billion-dollar investment in Nigerian oil (about half of total investment). One of these American companies has off-shore wells near the coast of Mid-Western State and was the only company able to continue production throughout the civil conflict.

Discovery and extraction of significant quantities of petroleum relieves, to some extent, agriculture's burden of supporting the Nigerian economy.

Business languages

Nigeria has dozens of tribal languages, but practically all international trade is conducted in English, the official language. Much domestic business is, of course, con-

ducted in the various native languages. One authority states that "the complexity of the linguistic pattern is probably unequalled in any African territory" and that the major groups are the Kwa, Hausa-Kotoko, and semi-Bantu languages.

Monetary zone

Nigeria continues as a member of the sterling zone. However, the country did not devalue its currency along with the United Kingdom in November 1967. The Nigerian pound is valued at U.S. \$2.80. It is divided into 20 shillings, which in turn are divided into 12 pence each.

However, on January 1, 1973, the Nigerian Government plans to change to a new monetary unit, the naira, to be worth 10 shillings. Each naira will contain 100 subunits, to be called kobos.

Banks

Nigeria has a highly developed system of bank offices, which have shown large increases in numbers in recent years. In 1950, there were 22 bank offices. This number had increased to 142 by 1957 and to 194 by 1964.

Most Nigerian banks are expatriate owned, with general headquarters in London. However, Nigeria is also the first country in tropical Africa with truly indigenous banking.

All the large international banks which do business in Nigeria have traditionally been chiefly involved in the financing of foreign trade. Though of little or no benefit to agricultural production as such, these banks have been very important in the purchase and export of Nigerian agricultural commodities.

Measures used

Imperial weights and measures are used. These include the long ton of 2,240 pounds, the British hundredweight of 112 pounds, and the cental of 100 pounds. The imperial gallon contains 5

U.S. quarts (1.2009 U.S. gallons). In practice, the cigarette tin (in which 50 cigarettes are sold) is a universal measure of bulk in Nigeria. It is used for measuring small portions of rice, beans, and other similar items for sale and in measuring ingredients for home cooking.

Nigeria's Federal Executive Council has given approval to a changeover to the metric system, but no effective date has been announced.

PROSPECTS FOR AGRICULTURAL PRODUCTION AND TRADE

According to the FAO publication, Agricultural Development in Nigeria, 1965-1980, the future burden of agriculture is to provide:

- 1.--The food requirements of a rapidly growing population;
- 2.--The agricultural raw materials for developing industries;
- 3.--The volume of exports needed to pay for imports of capital goods;
- 4.--Employment for the additional agricultural workers; and
- 5.--A substantial share of the capital to finance development of the whole economy.

When these words were written, the authors could not have foreseen that the Nigerian civil conflict would make the task of Nigerian agriculture more burdensome than predicted. Nor did they realize that Nigerian petroleum development would be so rapid and that petroleum exports would share--so soon--a part of agriculture's responsibilities.

Some ways to increase agricultural production are set forth below.

- 1.--Timely planting of cotton and peanuts;
- 2.--Replanting of palm oil and rubber groves with new high-yielding varieties;

- 3.--More careful and efficient tapping of rubber trees;
- 4.--More effective weeding of row crops, possibly by use of ox-drawn cultivating plows;
- 5.--Extension of land planted to tree and annual crops (Nigeria has much additional land available);
- 6.--Greatly expanded use of fertilizers, especially on corn and grain sorghum. (Much research on fertilizer response under Nigerian conditions remains to be done. Also, local fertilizer factories will need to be built to help bring down the cost of plant nutrients);
- 7.--Selection and distribution of seeds of higher yielding varieties of various food and export crops;
- 8.--More intensive use of lands in the "middle belt" for grain;
- 9.--Use of better crop storage facilities to reduce losses from insects, rodents, and weather;
- 10.--Providing, so far as possible, favorable prices and other incentives so that farmers will increase farm production to desirable levels;
- 11.--Improving the infrastructure (roads, railroads, docks, river boats, telegraph, postal system, and electric power) to permit more efficient transportation and marketing of farm products;
- 12.--Improvements in use of hand tools, such as using a sickle or grain cradle instead of a knife to harvest rice and other small grains;
- 13.--Sale and slaughter of cattle at younger ages, thus greatly increasing the "harvest;"
- 14.--Increase in goat numbers, since goats thrive with less care and under more difficult conditions than other livestock;

15.--Substantial increase in number of hogs raised in commercial feeding pens; and

16.--Development of a commercial poultry industry to supply cities with both eggs and broilers.

Actual methods to be used in pursuit of these goals are expected to come from demonstration plots, farm extension, agricultural education, and cooperatives.

Certain projects for agricultural improvement will probably need to be deferred for the time being; such as large-scale irrigation projects; extensive tractor mechanization; and harvesting with complicated and expensive combines and mechanical cotton pickers.

OUTLOOK FOR THE ECONOMY

Over all, development prospects for the Nigerian economy appear to be quite good. The blueprint to economic development until 1974 is found in a new 4-year, \$4.5 billion National Development Plan. The new plan envisages an annual growth rate over the planned period of about 7 percent. According to the plan, 24 percent of resources are allocated to transport, 16 percent to education, and 11 percent to agriculture. For the private sector, \$1.15 billion, or almost half its contribution, is expected to come from foreign investors. Almost two-thirds of foreign investments will be made by petroleum companies; the petroleum sector is expected to grow about 40 percent each year. Manufacturing will be the next fastest growing sector at a rate of about 12 percent annually.

An unpublished report recently prepared for ERS by the University of Edinburgh is somewhat less optimistic than the framers of the 4-year Development Plan. However, the Edinburgh economists also foresee fairly rapid growth of the Nigerian economy. They expect export items (mainly petroleum and farm products) to lead in development. These economists also project that Nigeria's gross domestic product will grow between 3 and 5 percent a year during the next 5 years. Their projections and analyses are generally based on the pre-war years, 1950-65.

Main agricultural findings of the Edinburgh study are described below.

Cocoa

Cocoa production is expected to increase slowly and export availabilities should total between 254,000 and 279,000 tons by 1974-76. Though future demand for cocoa is difficult to project, the authors observe that the main growth in demand will be in Japan and Soviet bloc countries, where consumption is much lower than in Europe and North America. Nigeria is expected to maintain its fair share of the world market through continued expansion of area and better control of diseases.

Vegetable Oils and Oilseeds

In recent years, net exports of oilseeds and vegetable oils have represented about 12 percent of world net exports. The Edinburgh economists foresee a rise in quantity and value of exports of peanuts and peanut oil to 1975 but no significant gain in exports of palm oil and palm kernels. Exports are projected to total 1.3 million tons in 1975, compared with 1.2 million tons in 1965. Opportunities for expanding output of both peanuts and oil palms are quite good. For oil palms, improved varieties set out in plantations could greatly increase output. However, increased domestic demand and lack of adequate marketing facilities will tend to hold down exports during the next 5 years or so.

Rubber

The outlook for the Nigerian rubber industry is less optimistic, according to the Edinburgh study. A leveling off in world demand has depressed prices and output and quality of rubber in Malaysia has increased. The University of Edinburgh economists do not expect that annual Nigerian exports in the near future will exceed 71,000 tons; the more likely level is 51,000 to 66,000 tons. However, the authors state that if the Nigerian rubber industry can effectively introduce technological improvements for processing, their prediction could be altered.

Cotton

Cotton production in Nigeria is now geared almost entirely to demands of the domestic textile manufacturing industry rather than to exports. According to the study, import substitution is as important to Nigeria's trade balance as export promotion. The contribution cotton production has made may be judged by the fact that in 1965, 103 million square yards were produced domestically and 210 million square yards were imported. By 1966, domestic output had reached 177 million square yards while imports had dropped to 146 million. However, other things being equal, the Edinburgh economists expect Nigeria to continue expanding production of cotton and to produce sufficient quantities to satisfy domestic demand for the next decade.

Wheat

Nigeria does not have a favorable climate for wheat production. However, as noted previously, efforts are being made to increase output in an attempt to hold down imports of wheat. The authors of the Edinburgh report conclude that, even if Nigeria increases wheat production, the increase would not meet the higher demand. Therefore, they project that wheat imports will increase to 163,000 tons by 1975 and 229,000 tons by 1980, compared with 56,000 tons in 1965.

Rice

As noted previously, Nigeria can be considered largely self-sufficient in rice

production. The Edinburgh study supports this finding and expects that imports in 1975 and 1980 will be very small and limited to high-quality prepared rice.

Sugar

Nigeria's commercial sugar industry is relatively new. However, production is likely to expand fairly rapidly within the next decade. If the relative price of sugar continues to decline (which would lead to increased consumption), the Edinburgh economists expect that imports of sugar will amount to over 100,000 tons in 1975 and 1980. Imports in 1969 were about 70,000 tons.

Tobacco

Nigeria is a net importer of tobacco and this situation is expected to continue during the next decade. The Edinburgh study did not make quantitative estimates for tobacco imports. On a value basis, imports are expected to total about \$2.0 million in 1975, declining to \$1.3 million in 1980. However, these projected imports are somewhat higher than those of recent years.

Livestock Products

Nigeria is a large producer of livestock and livestock products, especially meat. According to the Edinburgh study, Nigeria is likely to be self-sufficient in meat production except for certain special products. However, imports of dairy products are expected to increase substantially over the 1965 level in both 1975 and 1980.

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